PUBLIC REVIEW DRAFT

CITY OF OAKLAND MEASURE DD IMPLEMENTATION PROJECT ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE #2006122048

LSA

July 2007

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STATE CLEARINGHOUSE #2006122048

Submitted to:

City of Oakland
Office of the City Administrator
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July 2007

CITY OF OAKLAND

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MEASURE DD IMPLEMENTATION PROJECT
NOTICE OF RELEASE AND AVAILABILITY OF
DRAFT ENVIRONMENTAL IMPACT REPORT (DRAFT EIR)
AND
NOTICE OF PUBLIC HEARING

TO: All Interested Parties

SUBJECT: Notice of Release/Availability of Draft Environmental Impact Report for the Measure DD Implementation Project and Notice of Public Hearing on the same

REVIEW PERIOD: July 20, 2007 – September 10, 2007

CASE NO.: ER 06-0017 (State Clearinghouse Number 2006122048)

PROJECT SPONSOR: City of Oakland

PROJECT LOCATION: The proposed components of the Measure DD Implementation Project would be located in the City of Oakland around Lake Merritt and the Lake Merritt Channel generally along Lakeshore Avenue, Lakeside Drive, and 12th Street; on the Oakland waterfront between Alice Street and 66th Avenue; at the Ira Jinkins Recreational Center on Edes Avenue in East Oakland; at the Studio One facility on 45th Street in North Oakland; and at multiple small creekside locations throughout the City.

PROJECT DESCRIPTION: In November 2002, Oakland voters passed a $198,250,000 bond measure entitled Oakland Trust for Clean Water, Safe Parks (Measure DD). This bond measure authorizes funding for physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration activities. The proposed project would implement the activities funded by Measure DD, which include the following:

- **Lake Merritt and Lake Merritt Channel Improvements**
  - 12th Street Improvements
    - Replace the 12th Street culvert at Lake Merritt Channel with a bridge to increase tidal flow into and out of Lake Merritt
    - Reconfigure 12th Street, create a new 4-acre park, and connect these features to the Lake Merritt Channel
  - Lake Merritt Channel
    - Construct a bridge to replace the existing culvert at 10th Street
    - Redesign Channel at the Lake Merritt flood control station at 7th Street
    - Improve bike, pedestrian access, restore wetlands and make other Channel and shoreline improvements
  - Lakeshore Avenue, El Embarcadero, Pergola, and E. 18th Street Pier Improvements
    - Consolidate the El Embarcadero roadway to form a "Grand Lake green link"
    - Renovate Pergola
    - Renovate E. 18th Street Pier

Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)

- Lakeside Drive and Municipal Boathouse

  Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)

  Renovate the Municipal Boathouse at 1520 Lakeside Drive and restore public use

- Snow Park and Lakeside-Harrison-20th Street Intersection

  Expand Snow Park and redesign the Lakeside Drive-Harrison Street-20th Street intersection

  Implement system-wide improvements including paths, irrigation, landscaping, furnishing, restrooms and signs

- Bellevue Avenue Redesign, Children's Fairyland and the Sailboat House

  Redesign Bellevue Avenue to improve circulation and to accommodate parking moved from the Sailboat House

  Renovate Children's Fairyland

  Renovate the Sailboat House and convert some of the adjacent parking lot to parkland

- Water Quality Control Measures and Other Improvements

  Install stormwater filters, floating trash barriers, and aerating fountains, and implement other water quality improvements, including goose management elements

  Repair or replace Lake Merritt retaining walls

- **Oakland Waterfront Trail and Access Improvements**
  - Acquire land for conservation and remediation purposes
  - Remediate hazardous materials from contaminated soils
  - Provide continuous public access from Jack London Square to Martin Luther King Jr. Regional Shoreline
  - Construct an access/overlook area at 66th Avenue
  - Acquire and develop Estuary Park, Meadow Park and a new park in the area of the 9th Avenue Terminal
  - Complete Union Point Park

- **East and North Oakland Recreational Facilities**
  - Construct the East Oakland Sports Complex
  - Renovate and restore Studio One Art Center

- **City-wide Creeks Restoration, Preservation and Acquisition**
  - Restore and rehabilitate creeks by creating natural meanders, regrading and stabilizing banks, removing failing structures, and landscaping with native plants
  - Acquire creekside properties to facilitate restoration and habitat preservation

Implementation of the Project is anticipated to require actions or approvals by the City including design review; conditional use permits; tree removal permits; grading permits, and creek protection permits. These actions will be considered after certification of the Draft EIR.

PUBLIC HEARING:

Wednesday, September 5, 2007 at 6:00 p.m. City Planning Commission, Hearing Room 1, City Hall, One Frank H. Ogawa Plaza (Draft EIR comments and comments on the Project)

ENVIRONMENTAL REVIEW: A Draft Environmental Impact Report (Draft EIR) has been prepared under the requirements of the California Environmental Quality Act (CEQA), pursuant to Public Resources Code Sections 21000 *et. seq*. The Draft EIR analyzed potentially significant environmental impacts in the following environmental categories: Land Use, Planning Policy, Transportation, Circulation and Parking, Air Quality, Noise, Biological Resources, Cultural Resources, Hydrology and Water Quality, Geology, Soils and Seismicity, Hazards and Hazardous Materials, Public Services and Recreation, Utilities and Infrastructure, Aesthetic Resources. The Draft EIR identified significant unavoidable impacts related to Transportation.

Copies of the Draft EIR are available for review or distribution to interested parties at no charge at the Community and Economic Development Agency, Planning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612, Monday through Friday, 8:30 a.m. to 5:00 p.m. Additional copies are available for review at the Oakland Public Library, Social Science and Documents, 125 14th Street, Oakland, CA 94612. The Draft EIR may also be reviewed on the City's website at:

www.oaklandnet.com/government/ceda/revised/planningzoning/majorProjectsSection/environmentaldocuments.html

The City of Oakland is hereby releasing this Draft EIR, finding it to be accurate and complete and ready for public review. Members of the public are welcome to attend the hearing and provide comments focusing on whether the Draft EIR is sufficient in discussing possible impacts to the environment as a result of this Project and ways those impacts may be avoided or minimized through mitigation measures. All comments received will be considered by the City prior to finalizing the EIR and to taking any further action pertaining to the Project. Comments **must be received no later than 4:00 p.m. on Monday, September 10, 2007,** and should be sent to the attention of Elois A. Thornton, Planner IV, City of Oakland, Community and Economic Development Agency, Planning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612; telephone: (510) 238-6284; e-mail: eathornton@oaklandnet.com. If you challenge the environmental document or other potential actions pertaining to the Project in court, you may be limited to raising only those issues raised at the public hearings described above or in written correspondence received by the Community and Economic Development Agency on or prior to September 10, 2007.

Elois A. Thornton
Planner IV

Date of Notice: July 20, 2007

File No. ER06-0017

PLACEHOLDER FOR NOA

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I. INTRODUCTION

A. PURPOSE OF THE EIR

The purpose of this Environmental Impact Report (EIR) is to inform City of Oakland decision-makers, other responsible agencies, and the general public of the proposed Measure DD Implementation Project components and the potential environmental consequences of the Measure DD Implementation Project. The City of Oakland is the Lead Agency for the environmental review of the proposed project. This EIR will be used by City of Oakland staff, the Planning Commission, the City Council, and several responsible agencies in their review of the proposed project and the various approvals required as described in Chapter III, Project Description.

B. PROPOSED PROJECT

Measure DD is a municipal bond measure passed by Oakland voters in 2002. Measure DD authorizes the City to issue bonds that fund two types of activities or actions: those that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. The locations of the proposed Measure DD Implementation Project components are identified in Figures I-1, I-2, and I-3.

The activities funded by Measure DD are grouped as follows for the purposes of this EIR:

- Lake Merritt and Lake Merritt Channel Improvements (Group 1)
- Oakland Waterfront Trail and Access Improvements (Group 2)
- North and East Oakland Recreational Facilities (Group 3)
- City-wide Creeks Restoration, Preservation and Acquisition (Group 4)

Details regarding the proposed activities and components within each implementation group are provided in Chapter III, Project Description. The level of detail provided in the project description for each group varies based on current conditions surrounding each proposed group's status and the level of available design detail. For example, many proposed components in the Lake Merritt and Lake Merritt Channel group and the Waterfront Trail group are near or under construction, and as such, detailed design level information is available.[1] In contrast, the proposed components within the Recreational Facilities and City-wide Creeks groups are at widely varied stages of design, with many components at an early stage of design. Thus, the Lake Merritt and Lake Merritt Channel group and the Waterfront Trail group (Groups 1 and 2) are described in the EIR at the project level, while the Recreational Facilities and City-wide Creeks groups (Groups 3 and 4) are described at the program level.

[1] In 2002, the Measure DD Implementation Project was analyzed in an Addendum to earlier environmental documents prior to the City Council's decision to place Measure DD on the ballot. Based on that analysis, the City proceeded to fund, design and construct some Measure DD components. In December 2006, the City initiated the preparation of this environmental analysis for the project in light of more developed project information. In the interim, some Measure DD-funded components had been designed, permitted and constructed in reliance on the previous Addendum, 2006 Lake Merritt Channel Wetlands and Widening Project EIR and related environmental documents.

C. EIR SCOPE

On December 8, 2006, the City circulated a Notice of Preparation (NOP) to help identify the types of impacts that could result from the proposed project, as well as potential areas of controversy. The NOP was mailed to public agencies (including the State Clearinghouse) and neighborhood organizations and individuals considered likely to be interested in the proposed project and its potential impacts. Additionally, a Public Hearing was held before the Oakland City Planning Commission on January 3, 2007 to solicit public comments. The public comment period was extended an additional two weeks (for a total of 44 days) to solicit comments. Comments received by the City on the NOP were taken into account during the preparation of this Draft EIR. The NOP and written comments are included in Appendix C.

Some of the specific issues and concerns identified during the scoping process that are addressed in the EIR include:

- Proposed removal and replacement of trees around Lake Merritt and the Lake Merritt Channel and the potential impact this action would have on visual resources, water quality, air quality and wildlife (including nesting birds and special status species);
- Proposed reconfiguration of El Embarcadero and its potential impacts on nearby Lakeview Library;
- Proposed widening of Lake Merritt Channel and the potential impact to wildlife caused by increasing the Channel's accessibility to recreational users;
- Proposed renovation of buildings and other activities that might affect historic resources including Lake Merritt's status as the nation's first wildlife refuge;
- Proposed reconfiguration of parking at the Municipal Boathouse and the impact on visual resources;
- Proposed reconfiguration of Lakeside Drive, Lakeshore Avenue, 12th Street and other streets and the potential impacts related to traffic, air quality and noise;
- Proposed remediation of contaminated materials at sites along the Waterfront Trail and the potential effects on public health, water quality and air quality;
- Proposed operation of new segments of the Waterfront Trail and other recreational components, such as bike lanes, and their potential impacts related to transportation, including automobile and bus traffic, rail lines and use of the Oakland Tidal Canal;
- Proposed project construction and potential impacts related to transportation (including bus service and railroad operations), air quality, water quality, noise and wildlife; and
- Cumulative impacts resulting from the proposed project.

D. REPORT ORGANIZATION

This EIR is organized into the following chapters:

- *Chapter I – Introduction*: Discusses the overall EIR purpose; provides a summary of the proposed project; identifies potentially significant issues and concerns; and summarizes the organization of the EIR.

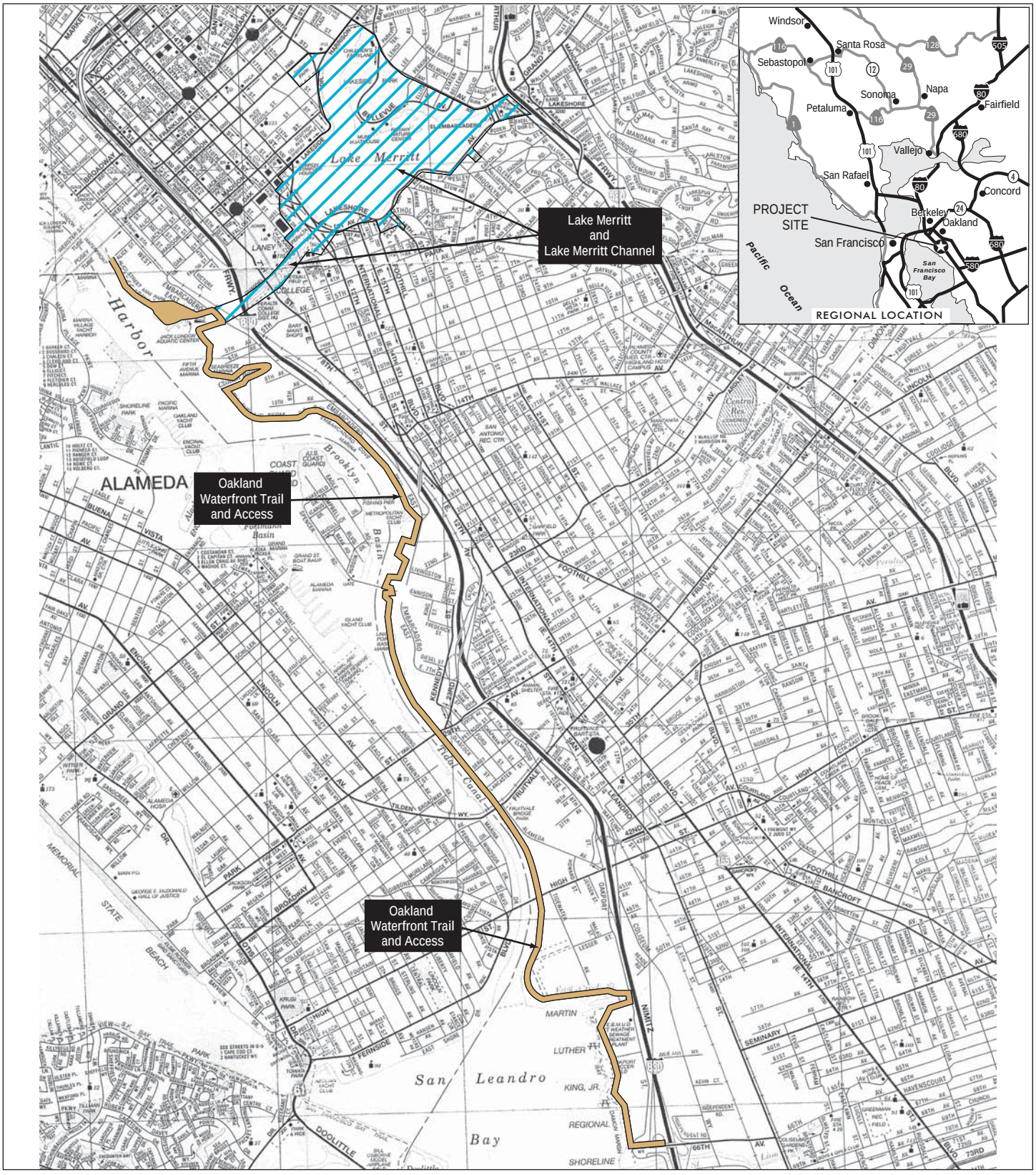

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FIGURE I-1

LEGEND

LAKE MERRITT AND LAKE MERRITT CHANNEL (GROUP 1)

OAKLAND WATERFRONT TRAIL AND ACCESS (GROUP 2)

0 1600 3200
FEET

Oakland Measure DD
Project Vicinity Map
Groups 1 and 2

SOURCE: CSAA; LSA ASSOCIATES, INC., 2007.

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FIGURE I-2

Oakland Measure DD
Project Vicinity Map
Group 3

SOURCE: CSAA; LSA ASSOCIATES, INC., 2007.

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FIGURE III-3

N

0 180 360
FEET

TREES LOCATED WITHIN THE UNSCREENED AREA
WOULD BE REMOVED AS PART OF THE PROJECT

[NOTE: MINOR CHANGES MAY BE MADE TO THE 12TH STREET TREE REMOVAL AREA]

Oakland Measure DD
12th Street Tree Removal Area
Conceptual Plan

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2007
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- *Chapter II – Summary*: Provides a summary of the impacts that would result from implementation of the proposed project and lists mitigation measures recommended to reduce or avoid significant impacts.
- *Chapter III – Project Description*: Provides background on the project, a description of the project objectives, project site, required approvals, and details of the project itself.
- *Chapter IV – Setting, Impacts and Mitigation Measures*: Describes the following for each environmental technical topic: existing conditions (setting); potential environmental impacts and their level of significance; and mitigation measures recommended to mitigate identified impacts. Potential adverse impacts are identified by levels of significance, as follows: less-than-significant impact (LTS), significant impact (S), and significant and unavoidable impact (SU). The significance of each impact is categorized before and after implementation of any recommended mitigation measure(s).

  The following environmental topics are addressed in Chapter IV:

  A. Land Use
  B. Planning Policy
  C. Transportation, Circulation and Parking
  D. Air Quality
  E. Noise
  F. Biological Resources
  G. Cultural Resources
  H. Hydrology and Water Quality
  I. Geology, Soils and Seismicity
  J. Hazards and Hazardous Materials
  K. Public Services and Recreation
  L. Utilities and Infrastructure
  M. Aesthetic Resources

  Within each topic area, the environmental setting is described and impacts are analyzed by project group (Groups 1 through 4). Mitigation measures are recommended, as appropriate. The impact analysis is organized around the criteria of significance developed by the City of Oakland. The criteria of significance are identified and then the level of significance of each impact is stated in the text and summarized in a table by project group. The *Impacts and Mitigation Measures Applicable to All Project Groups* are identified first, followed by *Impacts and Mitigation Measures Applicable to Specific Project Groups*.
- *Chapter V – Alternatives*: Provides an evaluation of alternatives to the proposed project which includes the No Project alternative.
- *Chapter VI – CEQA-Required Assessment Conclusions*: Provides the required analysis of growth-inducing impacts; significant irreversible changes; unavoidable significant effects; cumulative impacts; and effects found not to be significant.
- *Chapter VII – Report Preparation:* Identifies preparers of the EIR, references used, and the persons and organizations contacted.
- *Appendices:* The appendices contain the NOP and comments on the NOP, technical calculations, and other documentation prepared in conjunction with this EIR.

II. SUMMARY

A. PROJECT UNDER REVIEW

This Draft EIR has been prepared to evaluate the environmental impacts of implementing Measure DD (the project), which is a municipal bond measure passed by Oakland voters in 2002. Measure DD authorized the City to issue bonds that fund two types of activities or actions: those that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. The proposed activities to be funded by Measure DD are grouped as follows for the purposes of this EIR:

- Lake Merritt and Lake Merritt Channel Improvements (Group 1)
- Oakland Waterfront Trail and Access Improvements (Group 2)
- North and East Oakland Recreational Facilities (Group 3)
- City-wide Creeks Restoration, Preservation and Acquisition (Group 4)

A more detailed description of the proposed project is provided in Chapter III, Project Description.

In 2002, the Measure DD Implementation Project was analyzed in an Addendum to earlier environmental documents prior to the City Council's decision to place Measure DD on the ballot. Based on that analysis, the City proceeded to fund, design and construct some Measure DD components. In December 2006, the City initiated the preparation of this environmental analysis for the project in light of more developed project information. In the interim, some Measure DD-funded components had been designed, permitted and constructed in reliance on the previous Addendum, 2006 Lake Merritt Channel Wetlands and Widening Project EIR, and related environmental documents.

B. SUMMARY OF IMPACTS AND MITIGATION MEASURES

This summary provides an overview of the analysis contained in Chapter IV, Setting, Impacts, and Mitigation Measures. CEQA requires a summary to include discussion of: 1) potential areas of controversy; 2) significant impacts; 3) recommended mitigation measures; and 4) alternatives to the proposed project.

1. Potential Areas of Controversy

The potential areas of controversy surrounding the proposed project that were identified as part of the City's initial assessment, EIR scoping, and Notice of Preparation (NOP) process and are evaluated in Chapter IV of the EIR, are listed below:

- Proposed removal and replacement of trees around Lake Merritt and the Lake Merritt Channel and the potential impact this action would have on visual resources, water quality, air quality and wildlife (including nesting birds and special status species);

- Proposed reconfiguration of El Embarcadero and its potential impacts on nearby Lakeview Library;
- Proposed widening of Lake Merritt Channel and the potential impact to wildlife caused by increasing the Channel's accessibility to recreational users;
- Proposed renovation of buildings and other activities that might affect historic resources including Lake Merritt's status as the nation's first wildlife refuge;
- Proposed reconfiguration of parking at the Municipal Boathouse and the impact on visual resources;
- Proposed reconfiguration of Lakeside Drive, Lakeshore Avenue, 12th Street and other streets and the potential impacts related to traffic, air quality and noise;
- Proposed remediation of contaminated materials at sites along the Waterfront Trail and the potential effects on public health, water quality and air quality;
- Proposed operation of new segments of the Waterfront Trail and other recreational components, such as bike lanes, and their potential impacts related to transportation, including automobile and bus traffic, rail lines and use of the Oakland Tidal Canal;
- Proposed project construction and potential impacts related to transportation (including bus service and railroad operations), air quality, water quality, noise and wildlife; and
- Cumulative impacts resulting from the proposed project.

2. Significant and Less-than-Significant Impacts

Under CEQA, a significant impact on the environment is defined as: a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise and objects of historic or aesthetic significance.[1]

As discussed in Chapter IV of this EIR, implementation of the proposed project has the potential to result in adverse environmental impacts in several areas. Impacts associated with the following environmental topics would be significant without the implementation of mitigation measures, but would be reduced to a less-than-significant level if the mitigation measures recommended in this EIR are implemented:

- Land Use (Group 2)
- Transportation, Circulation and Parking (Group 1)
- Biological Resources (Groups 1, 2 and 4)
- Cultural Resources (Groups 1 and 4)
- Hydrology and Water Quality (Groups 1 – 4)
- Hazards and Hazardous Materials (Group 1)

[1] CEQA Sections 21060.5 and 21068.

The City's review of impacts presented in Chapter IV of this EIR has shown that the impacts associated with the following environmental topics would be less than significant and would not require any mitigation measures based on the identified criteria of significance:

- Planning Policy
- Air Quality
- Noise (but see Section II.B.3, Significant Unavoidable Impacts, below)
- Geology, Soils and Seismicity
- Public Services and Recreation
- Utilities and Infrastructure
- Aesthetic Resources

3. Significant Unavoidable Impacts

As discussed in Chapter IV of this EIR, the Lake Merritt and Lake Merritt Channel Improvements group (Group 1) of the proposed project would result in significant unavoidable transportation impacts in the topical area of transportation. These impacts include:

- **Impact TRANS-5 (Group 1)**: Under Cumulative Plus Project Conditions, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS F during the PM peak hour.
- **Impact TRANS-6 (Group 1)**: Under the Cumulative Plus Project Conditions, the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour.
- **Impact TRANS-7 (Group 1)**: Under the Cumulative Plus Project Conditions, the Lake Park Avenue/Lakeshore Avenue intersection would degrade to LOS F during the AM peak hour.

One other impact associated with the Group 1 would be reduced to a less-than-significant level by the City's Standard and Uniformly Applied Conditions of Approval. However, implementation of noise-reducing measures may not be feasible in all cases and, if not, the impact would be significant and unavoidable. The impact is as follows:

- **Impact NOISE-1 (Group 1)**: Pile driving would generate noise levels that exceed the City's long-term construction noise standards.

4. Alternatives to the Project

Alternatives are discussed in Chapter V of this EIR. They are organized according to the groups described in Section II.A above. All groups include a **No Project Alternative**. In addition the following group-specific alternatives are considered in this EIR:

a. Group 1 Alternatives

- The **Maintain Roadway Circulation Alternative** would eliminate or modify some of the proposed changes to the roadways around Lake Merritt in order to reduce traffic impacts. This alternative is specific to Group 1. To maintain travel lanes for traffic and transit flows on the streets near Lake Merritt the alternative would not include bike lanes (or as a variant, would include bike lanes but eliminate some curbside parking) along Lakeshore Avenue and Lakeside Drive. This alternative would keep El Embarcadero in its current configuration and maintain current travel patterns along the northeast end of Lake Merritt. The alternative would use the

alignment of 12th Street as proposed in the 2002 *Lake Merritt Master Plan* with added travel and turning lanes and fewer at-grade crossings for pedestrians in order to maintain traffic and transit flows along 12th Street.

b. Group 2 Alternatives

- The **Waterfront Trail Surface Street Connection Alternative** would eliminate the proposed boardwalks under the existing bridges as part of the Waterfront Trail, but would connect the Waterfront Trail using surface streets. In addition, other as yet incomplete portions of the trail would be routed onto streets rather than constructing new trails along the waterfront. This alternative would reduce impacts associated with hazardous waste, cultural resources and hydrology because fewer ground disturbing activities would be required to construct the project. This alternative is also proposed, in part, because it is uncertain whether the U.S. Coast Guard or other agencies that may have jurisdiction over the Tidal Canal will issue a permit to construct the boardwalks that would continue the trail beneath bridges and because it is uncertain whether some property owners will allow easements to accommodate the trail. The U.S. Coast Guard may have jurisdiction over that part of the Tidal Canal under bridges, but not the remainder of the canal, which is under the jurisdiction of other agencies, such as the U.S. Army Corps of Engineers.

c. Group 3 Alternatives

- The **Reduced Alternative** would construct a smaller sports complex at the Ira Jinkins Park/ Recreation Center site. Reducing the project in size would reduce, but not entirely eliminate, the potential for construction activities to affect biological or cultural resources and/or to encounter hazardous materials/wastes.
- The **Relocation Alternative** would construct the East Oakland Sports Complex at a location in East Oakland other than the Ira Jinkins Park/Recreation Center site. Relocating the project has the potential to reduce the potential for construction activities to affect biological or cultural resources and/or to encounter hazardous materials/wastes.

d. Group 4 Alternatives

- The **Reduced Alternative** would restore fewer habitats and/or acquire fewer creek sites than the proposed project. A reduced project with fewer construction sites would avoid short-term construction impacts at the eliminated sites, but the long-term beneficial effects of the creek restoration projects would be lost. In addition, if sites were eliminated from the acquisition list, the long-term benefit derived from the City's protection of these sites would not be realized.

C. SUMMARY TABLE

Information in Table II-1, Summary of Impacts and Mitigation Measures, has been organized to correspond with environmental issues discussed in Chapter IV. The table is arranged in four columns: 1) environmental impacts; 2) level of significance prior to mitigation; 3) mitigation measures; and 4) level of significant after mitigation. Levels of significance are categorized as follows: SU = Significant and Unavoidable; S = Significant; and LTS = Less-Than-Significant. A series of mitigation measures are noted where more than one mitigation measure is required to achieve a less-than-significant impact, and alternative mitigation measures area identified when available. For a complete description of potential impacts and recommended mitigation measures, please refer to the specific discussion in Chapter IV, Setting, Impacts, and Mitigation Measures.

Table II-1: Summary of Impacts and Mitigation Measures

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
A. Land Use			
LAND-1 (Group 2): Installation of the Hanson Aggregate Trail Connection could result in a land use compatibility conflict.	S	LAND-1(Group 2): A steel canopy shall be designed by a registered professional engineer, the design shall be reviewed by a safety professional, and the canopy shall be installed by the City under the conveyor belt to protect pedestrians using the trail. The canopy shall be installed prior to the opening of this segment of the Waterfront Trail. Implementation of this mitigation measure would reduce Impact LAND-1 to a less-than-significant level. However, this measure is dependent upon the City successfully entering into an agreement with the property owner to construct the steel canopy. Because the mitigation measure is needed to prevent a safety hazard as well as a land use conflict, the City shall not construct the trail across the property without including the protective canopy in the project design while the conveyor is in operation on the site. Should the property owner decline to allow the City to construct the canopy, the City shall not construct the trail on the property and instead reroute it onto City streets until such time as the use of the conveyor ceases or the property owner agrees to allow the City to construct the canopy.	LTS
B. Planning Policy			
There are no significant Planning Policy impacts.			
C. Transportation, Circulation and Parking			
TRANS-1 (Group 1): For Existing Conditions Plus the Project, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS E during the PM peak hour.	S	TRANS-1(Group 1): The City shall optimize the signal timing at the Santa Clara Avenue/Grand Avenue intersection to improve traffic operations during the PM peak hour. Signal optimization is expected to improve the intersection to LOS D.	LTS
TRANS-2 (Group 1): For Existing Conditions Plus the Project, the average vehicle delay at the Lake Park Avenue/Lakeshore Avenue intersection would increase by 38.6 seconds during the AM peak hour to a LOS F.	S	TRANS-2 (Group 1): The City shall make the following modifications at the Lake Park Avenue/Lakeshore Avenue intersection to improve traffic operations: 1. Convert the center northbound lane on Lakeshore Avenue from a through movement to a left turning movement and provide split signal phasing for eastbound and westbound Lakeshore Avenue traffic movements; and 2. Optimize traffic signal timing. This mitigation measure would reduce the total intersection average vehicle delay by 51.6 seconds during the AM peak hour, although the intersection would remain at LOS E, as it is under the existing condition. After project mitigation, the intersection would operate at a total average vehicle delay that would be 13 seconds lower than the delay with no project and no mitigation.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-3 (Group 1): For Existing Conditions Plus the Project, the average vehicle delay at the MacArthur Boulevard/Lakeshore Avenue intersection would increase by 13.8 seconds during the PM peak hour where the LOS is rated F without the project.	S	TRANS-3 (Group 1): The City shall make the following modifications at the MacArthur Boulevard/Lakeshore Avenue intersection to improve traffic operations: 1. Convert the combination left-through lane on eastbound MacArthur Boulevard to a through-only lane, resulting in one left-turn lane, two through lanes and one combination through-right turn lane; 2. Convert the center southbound lane on Lakeshore Avenue from a through movement to a combined through-left turning movement and provide split signal phasing for Lakeshore Avenue traffic movements; and 3. Optimize traffic signal timing. This mitigation measure would reduce the total intersection average vehicle delay by 39.3 seconds during the PM peak hour, and the intersection would operate at LOS E. After project mitigation, the intersection would operate at a total average vehicle delay that would be 25.5 seconds lower than the delay with no project and no mitigation.	LTS
TRANS-4 (Group 1): For Existing Conditions Plus the Project. the average vehicle delay at the 27th Street/Bay Place/Harrison Street intersection would increase by 4.6 seconds during the AM peak hour where the LOS is rated F without the project.	S	TRANS-4 (Group1): The City shall optimize the signal timing at the 27th Street/Bay Place/Harrison Street intersection to reduce the total intersection average vehicle delay by 49.9 seconds during the AM peak hour. Although with mitigation the intersection would remain at LOS F, it would operate at a total average vehicle delay that would be 45.3 seconds lower than the delay with no project and no mitigation.	LTS
TRANS-5 (Group 1): Under Cumulative Plus Project Conditions, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS F during the PM peak hour.	S	TRANS-5 (Group 1): Implementation of Mitigation Measure TRANS-1 would optimize the signal timing at the Santa Clara Avenue/Grand Avenue intersection and improve traffic operations to LOS E (73.9 seconds average delay) during the PM peak hour for the project under cumulative conditions. No other feasible mitigation measures were identified at this intersection as further improvements would entail widening of the roadway and require acquisition of right of way. Widening would also have adverse impact on the pedestrian environment at this heavily used intersection. After mitigation, the cumulative impact would remain significant and unavoidable.	SU

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-6 (Group 1): Under the Cumulative Plus Project Conditions, the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour.	S	TRANS-6 (Group 1): The City shall make the following modifications at the MacArthur Boulevard/Grand Avenue to improve traffic operations: 1. Convert the center southbound lane on Grand Avenue from a through movement to a combined through-left turning movement and provide split phasing for northbound and southbound Grand Avenue traffic movements; and 2. Optimize traffic signal timing for both AM and PM peak periods. The modifications at the MacArthur Boulevard/Grand Avenue intersection described above would reduce the delay from 120.2 seconds to 81.7 seconds under the Cumulative Plus Project Conditions, but the intersection would remain at LOS F during the PM peak hour. No other feasible mitigation measures were identified at this intersection as further improvements would entail widening of the roadway and require acquisition of right of way. Widening would also have adverse consequence for pedestrians. After mitigation, the cumulative impact of would remain significant and unavoidable.	SU
TRANS-7 (Group 1): Under the Cumulative Plus Project Conditions, the Lake Park Avenue/Lakeshore Avenue intersection would degrade to LOS F during the AM peak hour.	S	TRANS-7 (Group 1): The City shall implement Mitigation Measure TRANS-2 and make the following modifications at the Lake Park Avenue/Lakeshore Avenue intersection to improve traffic operations: 1. Add a left-turn lane from the freeway off-ramp on the westbound Lake Park Avenue approach to the intersection; and 2. Optimize traffic signal timing. The modification at the Lake Park Avenue/Lakeshore Avenue intersection described above would reduce the total intersection average vehicle delay by 115.3 seconds during the AM peak hour, although the intersection would operate at LOS E. After the project mitigation, the intersection would operate at a total average vehicle delay that would be 12.3 seconds lower than the delay under existing conditions with no project and no mitigation. Implementation of this mitigation measure would reduce the impact to a less-than-significant level. However, the City's ability to add the left-turn lane from the freeway ramp depends upon acquisition of right-of-way and an encroachment permit from Caltrans. Because the City cannot guarantee Caltrans' approval, the City is taking the conservative approach of considering this impact significant and unavoidable until sufficient right-of-way can be acquired and Caltrans approves an encroachment permit.	SU

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-8 (Group 1): Under the Cumulative Plus Project Conditions, the 10th Street/Oak Street intersection would degrade to LOS F during the AM peak hour.	S	TRANS-8 (Group 1): The City shall optimize the signal timing (modify the phase splits) at the 10th Street/Oak Street intersection to improve traffic operations. Implementation of the recommended mitigation would improve the intersection to LOS D during the AM peak hour.	LTS
TRANS-9 (Group 1): Under the Cumulative Plus Project Conditions, the 7th Street/Oak Street intersection would degrade to LOS F during the PM peak hour.	S	TRANS-9 (Group 1): The City shall optimize the signal timing (modify the phase splits) at the 7th Street/Oak Street intersection to improve traffic operations. Implementation of the recommended mitigation would improve the intersection to LOS D during the PM peak hour.	LTS
D. Air Quality			
There are no significant Air Quality impacts.			
E. Noise			
NOISE-1 (Group 1): Pile driving would generate noise levels that exceed the City's long-term construction noise standards.	LTS/S	The City's Standard and Uniformly Applied Conditions of Approval would reduce the impacts to less-than-significant levels. However, not all noise-reducing measures may be feasible in all cases and, if not, the impact would be significant and unavoidable.	SU
F. Biological Resources			
BIO-1 (Group 2): Construction of an observation structure at the 66th Avenue Gateway site may impact state or federally listed tidal marsh species.	S	BIO-1a (Group 2): Ground disturbance in the vicinity of Damon Marsh shall be conducted only when high tides are not at their winter or summer extremes, to reduce the likelihood that tidal marsh rails and SMHM will be present in the construction footprint. Ground disturbance shall be avoided during the highest tides of June–July and December–January (± one week each month).	LTS
		BIO-1b (Group 2): Prior to ground disturbance, a qualified biologist experienced with SMHM exclusion procedures shall prepare a site-specific SMHM avoidance plan. At a minimum, the plan shall include (1) the installation of silt fencing around the entire portion of the work area (that is within 100 feet from the edge of the marsh) to exclude SMHM from entering, (2) the clearing of all ground vegetation within the fenced area, and (3) the relocation to Damon Marsh of any SMHM found during the vegetation removal effort. Construction work shall start as soon as possible (and no longer than one week) after vegetation has been cleared. All exclusion measures and initial ground disturbance activities shall be monitored by a biologist, who has the necessary state and federal permits to handle and relocate SMHM.	

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-1 *Continued*		BIO-1c (Group 2): To avoid potential disturbance to nesting tidal marsh rails, construction of the observation structure shall be conducted during the non-breeding season (September 1 through January 31), unless prior surveys indicate that marsh habitat within 100 feet of the construction footprint is not part of an active rail breeding territory. Such surveys must be conducted in accordance with a project-specific survey protocol prepared in accordance with the USFWS and CDFG guidelines.	
BIO-2 (Group 2): Construction of the pile-supported boardwalks along the Waterfront Trail may impact fisheries resources within the Oakland Inner Harbor.	S	BIO-2 (Group 2): To avoid adverse impacts to Pacific herring, federally listed salmonids (chinook salmon, coho salmon, and steelhead), and EFH, pile driving shall occur within the June 1 to November 30 work window in accordance with NMFS guidelines.[1] Any pile driving occurring outside this period will require informal or formal consultation with the NMFS (for listed salmonids and EFH) and CDFG (for Pacific herring) prior to the Corps' issuance of a Section 404 permit for impacts to waters of the U.S.	LTS
BIO-3 (Groups 1, 2, and 4): Construction of some components within the Lake Merritt and Lake Merritt Channel, Waterfront Trail, and City-wide Creeks groups may impact waters of the U.S. and State.	S	BIO-3a (Groups 1, 2, and 4): All Measure DD-funded activities within jurisdictional waters shall first obtain authorization from the appropriate agencies (Corps, Water Board, CDFG, and BCDC). At a minimum, each activity will likely require a Section 404 Corps permit and Section 401 water quality certification from the Water Board. Creek restoration activities may also require a CDFG Lake or Streambed Alteration Agreement, depending on site-specific conditions. Construction of the fixed pier boardwalks along the Waterfront Trail will require BCDC approval since it proposes construction over and filling of Bay waters (i.e., concrete piers).	LTS

[1] National Marine Fisheries Service (NMFS). San Francisco Bay Project Impact Evaluation System (PIES) website. <http://mapping.orr.noaa.gov/website/portal/pies/faqs.html> Accessed April 12, 2007.

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-3 *Continued*		BIO-3b (Groups 1, 2, and 4): Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). If feasible, replacement habitat shall be created/preserved in the same general area as the original impact. Off-site mitigation may be approved if the amount of required replacement habitat exceeds that which is available near a given impact site. A wetland mitigation and monitoring plan (MMP) shall be developed for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s).	
BIO-4 (Group 1): The introduction of small boat traffic to the Lake Merritt Channel would result in increased disturbance levels to wintering migratory ducks and other waterbirds.	S	BIO-4 (Group 1): Small boat use of the Lake Merritt Channel shall be restricted to the non-wintering period of April–September, when waterbird abundance is low. During the closure period, booms shall be placed across the outlet to the Channel from Lake Merritt and at the 7th Street dam to prevent boat access and signs shall be posted indicating that the Channel is closed to recreational users. This would reduce the impact to a less-than-significant level.	LTS
G. Cultural Resources			
CULT-1 (Group 1): Project activities within the Lake Merritt and Lake Merritt Channel group may impact subsurface prehistoric archaeological materials that may qualify as historical resources under CEQA.	S	CULT-1 (Group 1): A qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards CFR 66, Appendix C, (48 FR 44738-9) and the certification requirements of the Register of Professional Archaeologists shall monitor initial project construction ground disturbing activities, such as trenching or excavating with a backhoe or bulldozer, in the 12th Street reconstruction area. The protocols for monitoring and data recovery outlined in the Archaeological Monitoring and Discovery Plan, 12th Street Reconstruction Project (AMDP)[1] shall be implemented. Monitoring shall continue as deemed necessary by the monitor based on the initial observations. If the monitor observes subsurface prehistoric archaeological materials during excavation, such as those associated with CA-ALA-5 or P-01-010694, the monitor shall ensure that appropriate actions are taken as described in the following paragraphs.	LTS

[1] William Self Associates, Inc., 2005:4-9. *Archaeological Monitoring and Discovery Plan, 12th Street Reconstruction Project*. William Self Associates, Inc., Orinda, California.

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-1 *Continued*		In the event that archaeological materials are identified (e.g., obsidian, heat-affected rock, faunal bone, and midden), the archaeologist will immediately notify the Construction Manager, who will temporarily stop construction to permit an examination of the find. Should the monitoring archaeologist determine that the cultural object or feature is significant (i.e., appears eligible for listing in the California Register of Historical Resources), a determination will be made as to the areal extent of the find, and the time required to mitigate (i.e., record and remove or collect all or part of) the discovery. Once the archaeological monitor has made a determination as to the time required to mitigate the find, and has sufficient supporting information, the monitor will take the following steps: 1) record, but not remove materials if non-cultural or non-significant, and allow work to progress, or 2) record and remove the isolated or limited cultural materials and permit work to progress. If the above steps do not apply (i.e., in those instances where the cultural materials are significant and not isolated or spatially limited), then the Construction Manager shall be notified and recovery of the materials shall occur. Diagnostic artifacts, as well as those classes of artifacts for which an adequate sample has not yet been recovered, shall be collected and bagged following photographing and recording of provenience. Mapping of deposits would be coordinated using existing engineering survey controls, and elevation accuracy will be maintained during the excavation to permit provenience controls for artifact recording. All information needed, including soil color or type, elevation, location, photographs, and sketch maps will be gathered as quickly as conditions permit to allow resumption of construction activities. All recovered cultural materials shall be cleaned as appropriate, preserved if necessary, bagged, and tagged or marked so as to permit its identification in an acceptable record system, and in accordance with recognized professional standards. All recovered cultural material shall be analyzed sufficiently to permit identification in accordance with recognized professional standards and submitted to a curation facility, as appropriate. A Final Monitoring Report shall be prepared, describing the results of monitoring, data recovery, and analysis.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-2 (Group 4): Project activities associated with the City-wide Creeks group may impact historical resources.	S	CULT-2 (Group 4): A preconstruction cultural resources study by a qualified person shall be done for the City-wide Creeks project sites, unless the proposed activities at the site would involve minimal (or no) ground disturbance, such as weeding, hand planting, sign placement, or pruning. For this non-intrusive or minimally intrusive work no mitigation would be needed. For all other work, the preconstruction study will be used to determine whether cultural resource(s) will be adversely affected by project activities and will ensure that, if a cultural resource(s) is present within a City-wide Creek restoration site, impacts to this resource will be avoided or mitigated. The first phase of the study will assess the prehistoric and historical sensitivity for each City-wide Creeks restoration site (or group of sites) and will review project plans to assess the potential for project activities to impact cultural resources at a creek restoration site. The study will include a literature review and a records search at the Northwest Information Center, Rohnert Park, and a site visit to determine the likelihood of recorded or surface-exposed cultural resources at a creek restoration site. A brief letter report shall be prepared for the City that includes the results of the background research and, based on the results of the background research, a determination of whether additional study for cultural resources at a given location will be necessary. If no cultural resources that would be disturbed by the project activities are identified in this phase, the City's Standard Conditions of Approval, which address accidental discoveries, shall be implemented and would reduce the impact to a less-than-significant level. If cultural resources that could be disturbed by the project activities are tentatively identified, additional study, construction monitoring, and mitigation, as appropriate, shall be performed.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-2 *Continued*		If cultural resources that could be disturbed by the project activities are tentatively identified, a field survey shall be conducted to identify the cultural resources and an archaeological excavation shall be performed, as necessary, to determine whether archaeological deposits are present. The excavation phase may be conducted during the initial ground disturbing work at the site(s). If the excavation phase is conducted during the initial ground disturbing work, the monitoring protocols described in CULT-1 shall be followed. If no cultural resources are identified in this phase, the City's Standard Conditions of Approval, which address accidental discoveries, shall be implemented and would reduce the impact to a less-than-significant level. If cultural resources are identified, the cultural resources shall be preserved, mapped and otherwise documented as described in CULT-1. Implementation of these measures will reduce the impact to a less-than-significant level.	
H. Hydrology and Water Quality			
HYD-1 (Groups 1 – 4): Existing groundwater well(s), that may be encountered and/or damaged by proposed project activities, could act as conduits for migration of pollutants to the underlying groundwater aquifer.	S	HYD-1 (Groups 1 – 4): Any existing wells discovered during the implementation of Measure DD shall be either: 1) properly abandoned in compliance with the California Department of Water Resources California Well Standards and Alameda County Environmental Health Department requirements prior to final approval of the grading plan; or 2) inspected by a qualified professional to determine whether each well is properly sealed at the surface to prevent infiltration of water-borne contaminants into the well casing or surrounding gravel pack. The California Well Standards require an annular surface seal of at least 20 feet. If the wells are found not to comply with this requirement, the City shall retain a qualified well driller to install the required seal.	LTS
I. Geology, Soils and Seismicity			
There are no significant Geology, Soils and Seismicity impacts.			
J. Hazards and Hazardous Materials			
HAZ-1 (Group 1): The Reconstruction of 12th Street would temporarily close a designated emergency evacuation route. (S)	S	HAZ-1 (Group 1): In advance of construction, the City shall prepare detour plans for the emergency evacuation route along 12th Street in accordance with the City's Office of Emergency Services requirements. The plans shall be reviewed and approved by the Office of Emergency Services prior to the start of construction. The implementation of the plans during construction would ensure that alternative emergency evacuation routes are identified and available during project construction and would reduce the impact to a less-than-significant level.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
K. Public Services and Recreation			
There are no significant Public Services and Recreation impacts.			
L. Utilities and Infrastructure			
There are no significant Utilities and Infrastructure impacts.			
M. Aesthetics			
There are no significant Aesthetics impacts.			

III. PROJECT DESCRIPTION

This EIR analyzes the potential environmental impacts of the proposed projects authorized and proposed to be funded by Measure DD, a bond measure approved by Oakland voters in November 2002. This chapter includes: background information on Measure DD; the objectives of the proposed Measure DD implementation components; a description of each proposed Measure DD implementation component and its location; the required approvals and entitlements associated with the proposed projects; and the intended uses of the EIR.

To facilitate the discussion and description of the Measure DD Implementation Project, the improvements to be funded by Measure DD have been divided into four groups:

- Lake Merritt and Lake Merritt Channel Improvements (Group 1);
- Oakland Waterfront Trail and Access Improvements (Group 2);
- North and East Oakland Recreational Facilities (Group 3); and
- City-wide Creeks Restoration, Preservation and Acquisition (Group 4).

Figures I-1, I-2, and I-3 show the general location of the groups of proposed Measure DD components.

For the purposes of this EIR, each individual proposed project authorized and proposed for funding by Measure DD is considered a "component" of Measure DD implementation. All components of Measure DD implementation are considered the "project" examined within this EIR.

A. MEASURE DD BACKGROUND

In November 2002, Oakland voters passed a $198,250,000 bond measure entitled *Oakland Trust for Clean Water, Safe Parks* (Measure DD). This bond measure authorizes funding for physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration activities.

In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures in previously prepared CEQA documents and thus the City prepared an Addendum to the previous environmental documents.

As more defined proposed project components have been identified since the 2002 Addendum, the City has now decided to prepare this EIR to provide a more comprehensive environmental analysis for the Measure DD Implementation Project. As some project components had already been planned, designed and funded in reliance upon the 2002 Addendum and prior to the City's decision to prepare this EIR, some components of Measure DD have already been constructed or are currently under construction. These components are described and analyzed at a level appropriate to their stage of development when the NOP for the project was issued in December 2006.

As of this writing, there is a pending lawsuit that challenges the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. The City has not implemented these approvals during the pendecy of the lawsuit.

B. PROJECT OBJECTIVES

As stated in Section 3 of the 2002 ballot measure, the "object and purpose [of Measure DD] is to acquire and construct water quality improvements for and related to Lake Merritt, Lake Merritt Channel, the Estuary and creeks in Oakland; to improve, renovate and construct youth and public recreational facilities including the East Oakland Sports Center, Studio One and Fairyland; to rehabilitate and acquire parks, open space and other recreational safety and maintenance facilities; and to provide safe public access to Lake Merritt, Lake Merritt Channel, and the Estuary." In addition, the City Council Resolution that placed Measure DD on the ballot indicates that the measure's funding is intended to support a number of the objectives laid out in the elements of the City's General Plan, including the OSCAR Element and the Estuary Policy Plan. In consideration of this background information, specific objectives for the four Groups of project components include without limitation:

Lake Merritt and Lake Merritt Channel Improvements (Group 1)

- Create recreational park and open space at Lake Merritt and along the Lake Merritt Channel;
- Connect the isolated southern shoreline of Lake Merritt with surrounding cultural, civic, and urban districts;
- Enhance the connection between Lake Merritt, the Lake Merritt Channel, and the Oakland Estuary;
- Renovate historic buildings and other structures at Lake Merritt;
- Improve bicycle and pedestrian safety and circulation;
- Improve water quality and habitat for fish and wildlife;
- Provide safe public spaces; and
- Support the following objectives for parks and recreation as set forth in the OSCAR Element:
    - Maintain an urban park…system which provides open space for outdoor recreation, psychological and physical well-being, and relief from the urban environment;
    - Protect scenic views and improve visual quality;

- Minimize the adverse effects of urbanization on Oakland's groundwater, creeks, lakes, and near-shore waters;
- Protect the ecology and promote the beneficial uses of Oakland's creeks, lakes, and near-shore waters;
- Reduce the deficiencies in park acreage and recreational facilities in the most equitable, cost-effective way possible; and
- Improve personal safety and reduce crime in Oakland's parks.

Oakland Waterfront Trail and Access Improvements (Group 2)

- Acquire land and construct pathways to complete the San Francisco Bay Trail along the Oakland Estuary;
- Provide additional open space and recreational opportunities along the Oakland waterfront;
- Remediate environmental hazards that exist on the Oakland component of the San Francisco Bay Trail;
- Support the following objectives for the waterfront as set forth in the Estuary Policy Plan:
  - Provide for public activities that are oriented to the water;
  - Create a clear and continuous system of public access along the Estuary shoreline;
  - Develop opportunities for recreational activities that are oriented to the waterfront and serve identified neighborhood needs;
  - Encourage the development of educational and cultural programs and interpretive facilities that enhance understanding of the waterfront environment;
  - Improve and clarify regional access to Oakland's waterfront;
  - Establish a continuous waterfront parkway; a safe promenade for pedestrians, bicycles, and slow-moving automobiles;
  - Improve pedestrian and bicycle circulation; and
- Support the following objectives for the parks, recreation and the waterfront as set forth in the OSCAR Element:
  - Maintain an urban park…system which provides open space for outdoor recreation, psychological and physical well-being, and relief from the urban environment;
  - Develop a system of linear parks and trails which: (a) links existing parks together; (b) provides safe, convenient access to open space from residential areas and employment centers; (c) provides places to hike, bike, and experience Oakland's scenery; and (d) provides a means of moving from one place to another without an automobile; and
  - Increase physical and visual access to the Oakland shoreline and create new opportunities for shoreline recreation.

North and East Oakland Recreational Facilities (Group 3)

- Provide additional recreation facilities in East Oakland;

- Restore Studio One; and
- Support the following objective for recreational facilities as set forth in the OSCAR Element:
    - Maintain park facilities so that their ability to meet recreational needs is optimized and to rehabilitate recreational facilities on a regular basis so that they remain useful, attractive, and safe.

City-wide Creeks Restoration, Preservation and Acquisition (Group 4)

- Acquire and restore creek habitat;
- Improve water quality within the City of Oakland;
- Restore Oakland's creeks and wetlands to a more natural state in order to enhance the beneficial uses of creeks and wetlands. These beneficial uses include native wildlife habitat creation, cleansing of stormwater runoff, slope stabilization, stormwater conveyance and storage, sediment transport and storage, recreation and educational opportunities and improvement of neighborhoods through community building and aesthetic improvements;
- Support the following objectives for creeks as set forth in the OSCAR Element:
    - Conserve open space along Oakland's creeks, restoring the creeks where feasible and enhancing creek access on public lands;
    - Minimize the adverse effects of urbanization on Oakland's groundwater, creeks, lakes, and near-shore waters;
    - Protect the ecology and promote the beneficial uses of Oakland's creeks, lakes, and near-shore waters; and
- Support the following objectives of the Oakland Creek Protection Ordinance:
    - Safeguard and preserve creeks and riparian corridors in a natural state;
    - Preserve and enhance creekside vegetation and wildlife;
    - Prevent activities that would contribute significantly to flooding, erosion or sedimentation, or that would destroy riparian areas or would inhibit their restoration;
    - Enhance recreational and beneficial uses of Creeks;
    - Control erosion and sedimentation;
    - Protect drainage facilities;
    - Protect the public health and safety, and public and private property; and
    - Protect and enhance the water quality of Oakland's watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the federal Clean Water Act.

C. PROPOSED MEASURE DD IMPLEMENTATION COMPONENTS

Descriptions of the proposed components that comprise the four Measure DD implementation groups are provided in this section. The level of detail provided for each group and its proposed components varies based on current conditions surrounding each proposed project component and the level of

available detail. For example, some proposed components in the Lake Merritt and Lake Merritt Channel group and Waterfront Trail group are near or under construction, and as such, a detailed level of design information is available for their analysis and evaluation. In contrast, the proposed components within the North and East Oakland Recreational Facilities and City-wide Creeks groups are at widely varied stages of design. For example, the East Oakland Aquatic, Sports and Recreation Complex, one of the two recreational facilities identified in this group, is not yet fully funded and is still in an early stage of design while the other recreational component, Studio One Art Center, is already being renovated. Likewise, the City-wide Creeks group has proposed components at many levels of planning, design or construction, from completed project components to those that have not yet begun the design process. Table III-1 lists the components of Measure DD and their current stage of development.

As a result of the range in the level of detail currently available for the various proposed project components, the level of detail for the analysis of each component within this EIR also varies. Because fairly detailed information and plans are available for proposed components within the Lake Merritt and Lake Merritt Channel group and the Waterfront Trail group, these groups are evaluated at a project level. Proposed components within the Recreational Facilities and City-wide Creeks groups are analyzed at a program level. For the East Oakland Aquatic, Sports and Recreation Complex, the program-level analysis is appropriate because planning is still at a preliminary stage. For the City-wide Creeks group, acquisition and restoration is proposed to occur on many, small sites throughout Oakland that have not yet been specifically identified. Although each is unique, the types of activities required and their potential impacts would be similar and conducive to the application of performance standards that can be applied programmatically.

The following subsections describe the four Measure DD funded project groups and their associated components. Each proposed component is numbered for ease of reference.

1. Lake Merritt and Lake Merritt Channel Improvements (Group 1)

The major proposed components in the Lake Merritt and Lake Merritt Channel group are (beginning at the southern end of the Lake): the 12th Street Improvements (1a); Lake Merritt Channel (1b); Lakeshore Avenue, El Embarcadero, Pergola, and E. 18th Street Pier Improvements (1c); Lakeside Drive and Municipal Boathouse (1d); Snow Park/Lakeside-Harrison-20th Street Intersection (1e); Bellevue Avenue Redesign, Children's Fairyland, and the Sailboat House (1f). Additional proposed components include water quality improvements for the Lake and improvements of the Lake Merritt retaining walls (1g). The locations of these proposed components are shown in Figure III-1 and described in additional detail below. Given the level of detail known about these proposed components, they are analyzed within the EIR at a project level, as described above and within Chapter I, Introduction.

a. 12th Street Improvements (1a). Existing 12th Street is a 12-lane divided roadway that crosses the Lake Merritt Channel. Water passes under the roadway through a series of unnavigable culverts. Pedestrian and bicycle access between Lake Merritt Park and the Channel is only provided only through a tunnel. As part of the proposed Measure DD improvements, the 12th Street culvert at Lake Merritt Channel would be replaced with a 100-foot-wide open channel, spanned by bridges, to allow increased tidal flow into and out of Lake Merritt and greater public access to the Channel.

Table III-1: Measure DD Proposed Components

GROUP	STATUS
1. LAKE MERRITT AND LAKE MERRITT CHANNEL	
(1a) 12th Street Improvements	
Replace the 12th Street culvert at Lake Merritt Channel with a bridge to increase tidal flow into and out of Lake Merritt	Design drawings are complete.
Reconfigure 12th Street, create a new 4-acre park, and connect these features to the Lake Merritt Channel	Design drawings are complete.
(1b) Lake Merritt Channel	
Construct a bridge to replace the existing culvert at 10th Street	Design is underway.
Redesign Channel at the Lake Merritt flood control station at 7th Street	Design is underway.
Improve bike, pedestrian access, restore wetlands and make other Channel and shoreline improvements	Design is underway.
(1c) Lakeshore Avenue, El Embarcadero, Pergola, and E. 18th Street Pier Improvements	
Consolidate the El Embarcadero roadway to form a "Grand Lake green link"	Design drawings are complete.
Renovate Pergola	Renovation is complete.
Renovate E. 18th Street Pier	Design is complete.
Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)	Design drawings are nearly complete.
(1d) Lakeside Drive and Municipal Boathouse	
Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)	Design drawings are nearly complete.
Renovate the Municipal Boathouse at 1520 Lakeside Drive and restore public use	Interior demolition and asbestos/lead abatement work is complete. Main renovation construction is underway.
(1e) Snow Park and Lakeside-Harrison-20th Street Intersection	
Expand Snow Park and redesign the Lakeside Drive-Harrison Street-20th Street intersection	Concept plan complete. Design work has not yet begun.
Implement system-wide improvements including paths, irrigation, landscaping, furnishing, restrooms and signs	Some improvements are being designed and others are under construction.
(1f) Bellevue Avenue Redesign, Children's Fairyland and the Sailboat House	
Redesign Bellevue Avenue to improve circulation and to accommodate parking moved from the Sailboat House	Concept plan complete. Design work has not yet begun.
Renovate Children's Fairyland	Set renovation work began in April 2005, with the Chapel of Peace already completed. The puppet theater addition is complete. Pavilion and utility infrastructure project is out to bid.
Renovate the Sailboat House and convert some of the adjacent parking lot to parkland	Design work has not yet been started.

Table III-1 *Continued*

GROUP	STATUS
(1g) Water Quality Control Measures and Other Improvements	
Install stormwater filters, floating trash barriers, and aerating fountains, and implement other water quality improvements, including goose management elements	A new aeration fountain at Grand and Harrison is complete. Stormwater filters have been installed at several locations. Other projects are being considered.
Repair or replace Lake Merritt retaining walls	Some improvements have been completed. Others are associated with specific projects, such as renovation of the Municipal Boathouse.
2. OAKLAND WATERFRONT TRAIL AND ACCESS	
Acquire land for conservation and remediation purposes	One acquisition has been completed, others are in negotiation stage
Remediate hazardous materials from contaminated soils	Some remediation is complete (e.g., at Union Point Park). Other sites would be remediated as part of future projects.
Provide continuous public access from Jack London Square to Martin Luther King Jr. Regional Shoreline	Some connecting components are complete. Others are in the design phase or would be designed in the future.
Construct an access/overlook area at 66th Avenue	Design is underway.
Acquire and develop Estuary Park, Meadow Park and a new park in the area of the 9th Avenue Terminal	Oak to 9th developer is scheduled to build parks at Meadow Park and 9th Avenue, and clean up Estuary Park. Estuary Park design is on hold awaiting cleanup.
Complete Union Point Park	Construction is complete.
3. NORTH AND EAST OAKLAND RECREATIONAL FACILITIES	
Construct the East Oakland Sports Complex	Preliminary design is complete.
Renovate and restore Studio One Art Center	Renovation is currently underway.
4. CITY-WIDE CREEKS	
Restore and rehabilitate creeks by creating natural meanders, regrading and stabilizing banks, removing failing structures, and landscaping with native plants	Restoration activities are ongoing.
Acquire creekside properties to facilitate restoration and habitat preservation	Acquisition and preservation activities are ongoing.

Redesign of 12th Street between Oak Street and 3rd Avenue is proposed for this component. The 12th Street roadway in the area, including two earthquake-damaged overpasses, would be demolished and replaced with a 6-lane, tree-lined boulevard with signalized intersections, crosswalks, and a landscaped median. This action would also create approximately 4 acres of new parkland at the southern end of Lake Merritt would remove the pedestrian tunnels, provide safe and continuous access along the perimeter of the Lake, and improve the access to the Kaiser Convention Center and Laney College. Once the existing 12th Street roadway structure is demolished, typical construction activities would include clearing, grading, excavating, pile driving (in areas near the Channel), concrete placement, paving and replanting of landscaping with various pieces of construction equipment and by hand labor.

As part of this project component, the parking lot for the Kaiser Convention Center is proposed to be demolished and reconstructed. Bus stops would be located along 12th Street. The redesign of 12th Street would also create the following new intersections: 13th Street/14th Street; 11th-12th Street/14th Street; 12th Street/Kaiser Convention Center; 12th Street with East (E.) 12th Street; and Lakeshore Avenue/1st Avenue. The current intersection of Lakeshore Avenue and 12th Street would be closed to form a Lakeshore Avenue cul-de-sac with through traffic on Lakeshore Avenue diverted onto 1st Avenue. The demolition of E. 12th Street would create a City-owned, remnant parcel at the southeast corner of 1st Avenue and E. 12th Street. Figure III-2 shows a conceptual plan of the street realignment.

Implementation of these and other proposed traffic changes around Lake Merritt would transform the streets from high-speed commuter routes into calmer, scenic boulevards. Bicycle and pedestrian safety would be greatly improved, and the park itself would be significantly expanded. This component is closely linked to the proposed improvements to the Lake Merritt Channel, with the two components allowing for improved connectivity between Lake Merritt, the Oakland Estuary and San Francisco Bay for both the flow of water and recreational users.

The City is proposing to renovate existing plantings and irrigation around the 12th Street component site. This includes removing approximately 157 existing trees from the median strip along 12th Street, the Kaiser Convention Center parking lot and some areas along the banks of the Lake Merritt Channel and replanting these areas with approximately 321 new trees and other landscaping. The final numbers of trees removed or planted may differ slightly from these counts. Some trees would be removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy. Figure III-3 shows the area where trees are proposed to be removed as part of this project component. As part of the project design process the City hired a certified arborist to evaluate the trees proposed for removal around Lake Merritt and the Lake Merritt Channel. The arborist recommended preserving four trees in this area by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project. The arborist's report is provided in Appendix I.

LSA

FIGURE III-1

Oakland Measure DD
Lake Merritt and Lake Merritt Channel Components

LEGEND

PROJECT AREA FOR LAKE MERRITT AND LAKE MERRITT CHANNEL GROUP

HIGH PRESSURE WATER LINE TO SUPPLY NEW FIRE HYDRANTS

N

0 500 1000
FEET

NOTES:

1. LAKE MERRITT RETAINING WALL REPAIR AND OTHER PATH IMPROVEMENTS WOULD OCCUR AT VARIOUS LOCATIONS ON THE LAKE
2. LAKE MERRITT WATER QUALITY PROJECTS WOULD OCCUR AT VARIOUS LOCATIONS AROUND AND WITHIN THE LAKE AND ITS WATERSHED
3. A CENTRAL IRRIGATION CONTROL PROJECT WOULD BE INSTALLED AND LOCATED AT VARIOUS POINTS THROUGHOUT THE PROJECT AREA

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006

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LSA

FIGURE III-2

Oakland Measure DD
12th Street Conceptual Plan

N

0 180 360
FEET

SOURCE: SASAKI, NOV. 2005.
I:\RAJ0601 measure dd\figures\EIR\Fig_III2.ai (7/1/07)

LSA

FIGURE III-3

N

0 180 360
FEET

TREES LOCATED WITHIN THE UNSCREENED AREA
WOULD BE REMOVED AS PART OF THE PROJECT

[NOTE: MINOR CHANGES MAY BE MADE TO THE 12TH STREET TREE REMOVAL AREA]

Oakland Measure DD
12th Street Tree Removal Area
Conceptual Plan

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2007
I:\RAJ0601 measure dd\figures\EIR\Fig_III3.ai (7/1/07)

Design drawings for the proposed 12th Street project component have been prepared. Construction is proposed to begin in 2008 and take approximately two years to complete. Under the proposed plan, construction would be staged in a way that would maintain traffic, pedestrian, and bicycle connections between the east and west sides of Lake Merritt along the Frickstad Viaduct until the new roadway is complete adjacent to the Kaiser Convention Center. Once the new roadway is complete traffic, pedestrian, and bicycle connections would be transferred to the new roadway and the viaduct would be demolished. The City is also considering a construction phasing option that would shorten the construction period. This option would reroute traffic, pedestrians and bicycles to 10th Street and other streets, and close the 12th Street corridor completely during construction. As part of this option the City would temporarily prohibit parking along 10th Street in order to increase the number of travel lanes from one to two in each direction. Some intersections would also be signalized in order to improve traffic flow.

b. Lake Merritt Channel (1b). The Lake Merritt Channel is a narrow waterway that connects Lake Merritt with the Oakland Estuary and San Francisco Bay. The Measure DD Implementation Project components proposed along the channel are intended to improve water flow, provide small boat passage, enhance bicycle and pedestrian access, restore wetlands, and make other channel and shoreline improvements.

The existing 10th Street crossing of the Lake Merritt Channel consists of a box culvert covered by approximately 8 feet of earth fill that forms the roadway embankment. The culvert, which is unnavigable, consists of eight cells, each of which is 6 feet wide and 6 feet high.

The existing 7th Street crossing consists of a pump station covered by approximately 5 feet of earth fill that forms the roadway embankment. The existing 7th Street Pump Station is located within the 7th Street Bridge structure and is used primarily to prevent flooding during significant storm events by pumping water from the Lake to the Channel. Four 225 cubic feet per second capacity pumps are located within the pump station, which is operated by the Alameda County Flood Control and Water Conservation District (ACFCWCD). According to the ACFCWCD, the flood control pumps are utilized approximately 1 percent of the time. During the remainder of the year, tidal flow is conveyed by gravity through the two 12-foot by 17-foot box culverts that make up the pump station suction and discharge channels.[1]

As part of the Measure DD Implementation Project, the City proposes to widen the Channel, streambed, stream banks and upland areas between Lake Merritt and the Estuary by removing the 10th Street culvert and 12th Street culvert (discussed above) and grading the Channel's banks, thus creating additional areas of open water and tidal marsh as shown in Figure III-4. The bottom of the channel at 12th Street would be lowered. Shoreline improvements (e.g., pedestrian pathways) would be similar to the designs proposed for the 12th Street project component. The existing pedestrian bridge below 10th Street would be refurbished or replaced. The City is proposing to remove some existing trees (approximately 58) along the channel as shown in Figure III-5. Invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline and new intertidal and upland plantings consisting of native plants such as pickleweed (lower marsh areas), marsh gumplant, and salt grass (upper marsh areas and transitional zones characterized by native grasses), and shrubs and trees would be planted to restore the natural ecosystem of the Channel. Control measures for *Spartina*

[1] URS, 2004. *Technical Memorandum, City of Oakland, Lake Merritt Channel, Pump Station Alternatives.* June 26.

would include those approved by the San Francisco Estuary Invasive Spartina Project. The City also is proposing to install biofiltration basins to improve water quality. Typical construction activities would include clearing, grading, excavating, pile driving, and replanting of landscaping using various pieces of construction equipment and by hand labor.

This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt.

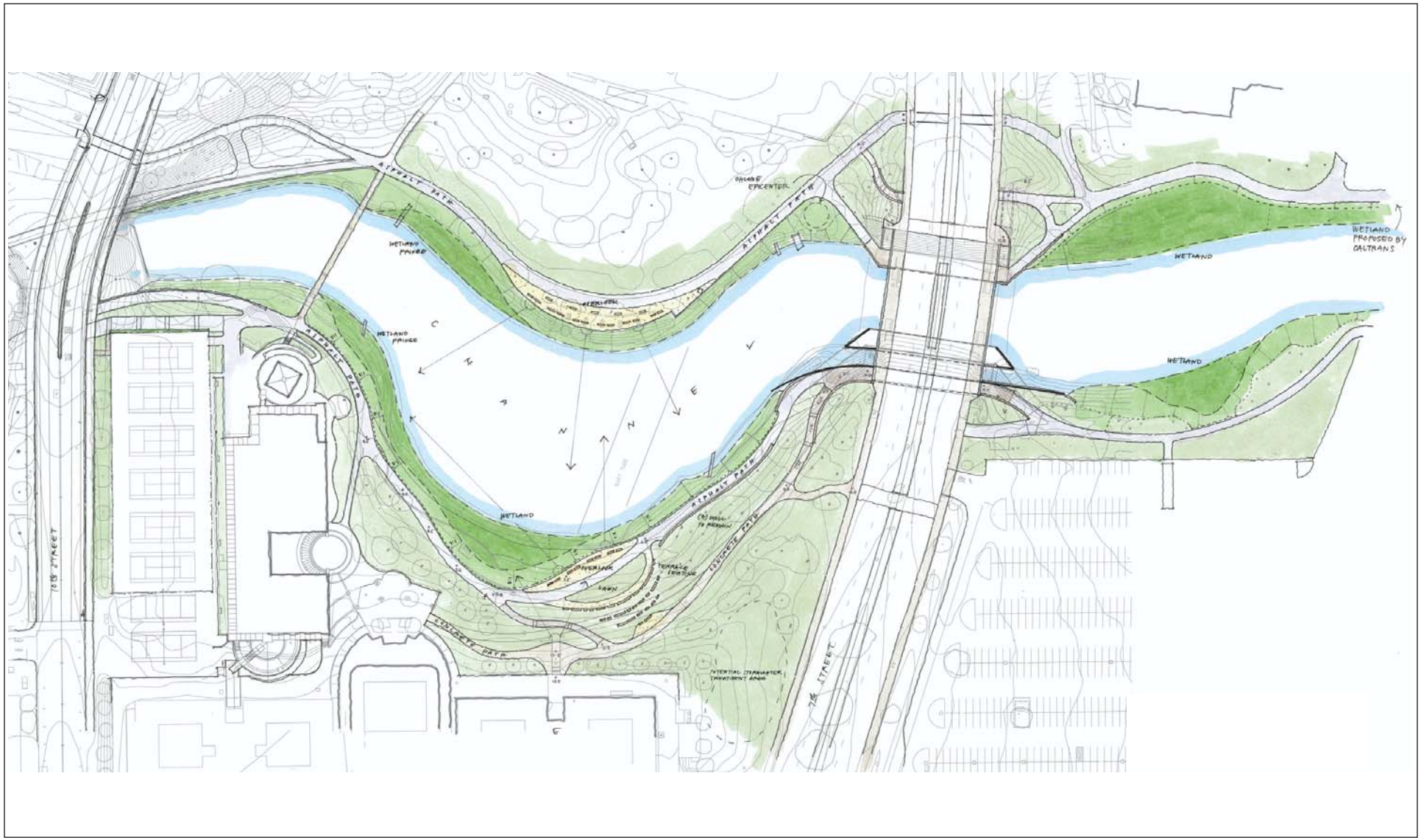
Designs for the 7th Street project component, the 10th Street Bridge, and related channel and park improvements have been completed to the conceptual stage. A conceptual plan of the improvements is shown in Figure III-4.

c. Lakeshore Avenue, El Embarcadero, Pergola, and E. 18th Street Pier Improvements (1c). A number of improvements are proposed along the portion of Lakeshore Avenue that extends along the eastern edge of the Lake from El Embarcadero and the Pergola to 12th Street including the reconfiguration of Lakeshore Avenue. Lakeshore Avenue is a four-lane street that runs along the eastern shore of Lake Merritt and is approximately 1 mile in length. Changes to Lakeshore Avenue, between MacArthur Boulevard and E. 18th Street, as shown in Figure III-1, are included as a Measure DD component. Two variants for Lakeshore Avenue are being evaluated and are described below.

(1) Lakeshore Avenue Variant A. As part of Variant A, Lakeshore Avenue would be narrowed from four lanes to two lanes for vehicle traffic and would include five-foot-wide Class 2 bike lanes. The new curb on the Lake Merritt side of Lakeshore Avenue would be constructed approximately 12 feet east of the existing curb location. The number of on-street parking spaces would remain approximately the same as currently exists. Figure III-6 is a conceptual plan which shows the proposed Lakeshore Avenue and El Embarcadero improvements. Typical construction activities would include removal of part of the existing roadway, clearing, grading, excavating, concrete placement, paving and replanting of landscaping using various pieces of construction equipment and by hand labor.

The City is proposing to install improved pathways on the west side of Lakeshore Avenue. They would consist of a continuous, 10-foot-wide, decorative concrete, multi-use trail with a parallel 3.5-foot-wide decomposed granite jogging trail. A new 6-foot-wide planting strip next to the new curb location would buffer the multi-use trail from the roadway. The shoreline trail would be constructed with polymer-hardened decomposed granite in order to provide a firm and stable surface to comply with the Americans with Disabilities Act (ADA). Park landscaping would be renovated with some trees removed. The City is currently finalizing the Lakeshore Avenue design.

New seating areas are proposed for development throughout the park. Pedestrian improvements would include reducing the crossing distance on Lakeshore Avenue by 12 feet, installing bulb-outs at the Cleveland Cascade, adding highly visible crosswalk pavement marking at mid-block crossings at the Lakeview Library and Cleveland Cascade, and creating pedestrian refuge islands at El Embarcadero, Boden Way, Brooklyn Avenue, and Wesley Avenue. ADA-compliant curb ramps would be



LSA

FIGURE III-4

Oakland Measure DD
Lake Merritt Channel
Conceptual Plan

N

0 80 160
FEET

SOURCE: SASAKI ASSOCIATES, INC., FEBRUARY 6, 2007
I:\RAJ0601 measure dd\figures\EIR\Fig_III4.ai (7/1/07)

LSA

LEGEND

- 346 TREES TO REMAIN
- 57 TREES POTENTIALLY IMPACTED (SEVERAL TRUNKS CLOSE TOGETHER WERE COUNTED AS A MULTI-TRUNK TREE)
- INVENTORY LIMIT LINE
- DIA — DIAMETER OF TRUCK @ 4' FROM GROUND
- THE NUMBER OF TREES TO BE REMOVED MAY CHANGE

0 100 200
FEET

[NOTE: MINOR CHANGES MAY BE MADE TO THE LAKE MERRITT CHANNEL LANDSCAPE PLAN]

FIGURE III-5

Oakland Measure DD
Lake Merritt Channel
Landscape Plan

SOURCE: GOLDEN ASSOCIATES, 2007
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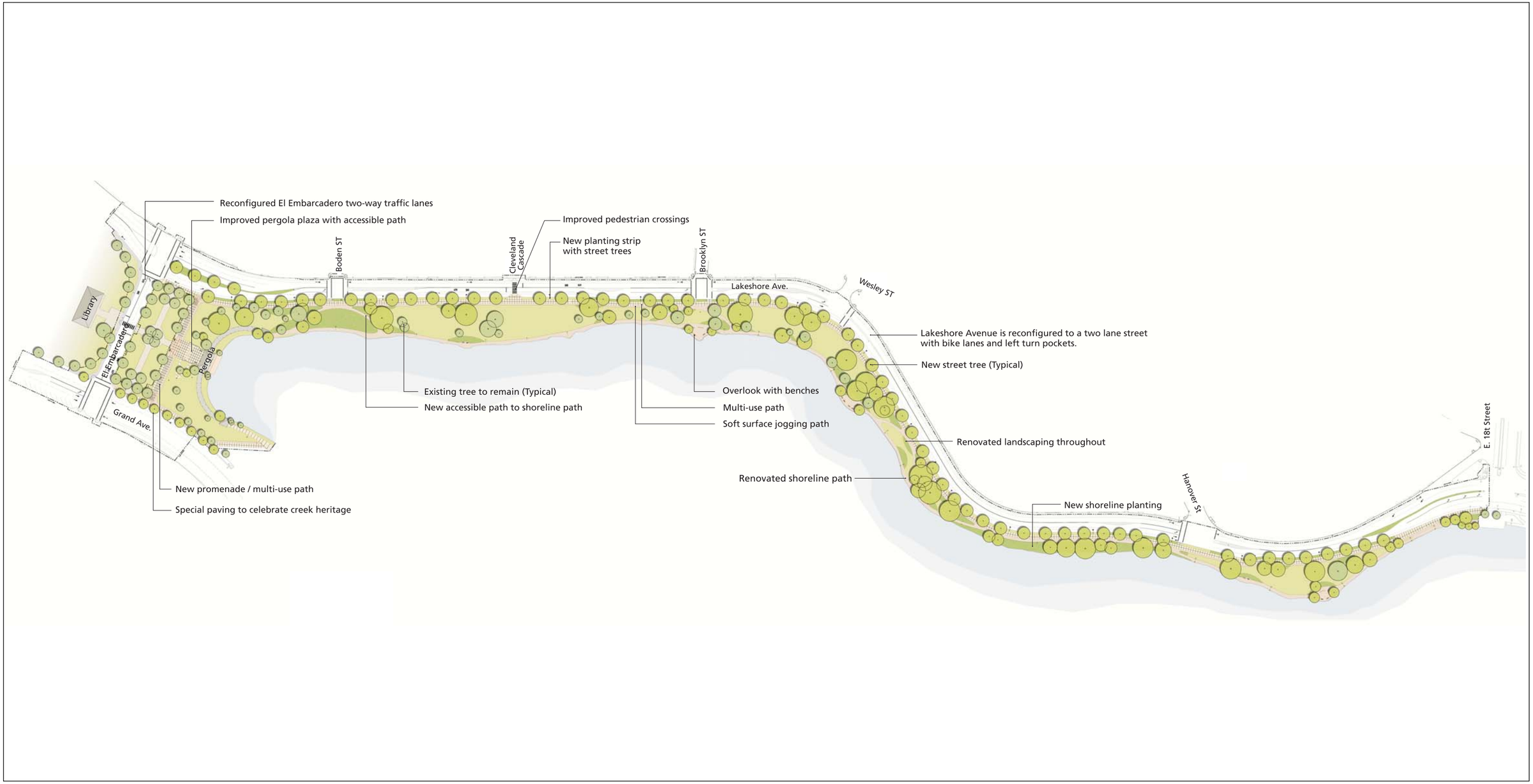

LSA

FIGURE III-6

Oakland Measure DD
Lakeshore Avenue/El Embarcadero/ Pergola
Conceptual Plan

N

0 160 240
FEET

SOURCE: WALLACE, ROBERTS & TODD, JANUARY 2006
I:\RAJ0606 measure dd\figures\EIR\Fig_III6.ai (4/24/07)

installed at all intersections and a ramp would be installed at the Pergola to provide wheelchair access.

(2) Lakeshore Avenue Variant B. Lakeshore Avenue Variant B proposes to re-stripe the street to create one travel lane in each direction, a Class 2 bike lane in each direction, a continuous left-turn lane down Lakeshore Avenue, and parking lanes along both curbs. A planting strip, including street trees, would be included along the park border. A multi-use path would be installed between the planting strip and the park landscaped area. As with Variant A, park landscaping would be renovated and the removal of some trees is proposed. The surface of the lakeside path would be resurfaced with stabilized decomposed granite and would be widened at the narrow spots. The pedestrian crossing at Cleveland Cascade would be improved and mid-street pedestrian islands would be included at intersections as appropriate. Typical construction activities would include paving, grading, path resurfacing and replanting of landscaping.

(3) Cleveland Cascade. The Cleveland Cascade is a series of staircases located on the east side of Lakeshore Avenue, south of the Lakeshore Avenue/Boden Way intersection. This stairway provides pedestrian passage between Lakeshore Avenue and Merritt Avenue. This area is proposed to be renovated with improved landscaping, removal of approximately six trees, repaired concrete work, lighting, and new handrails. Restoration of the water feature is also planned.

(4) El Embarcadero. At El Embarcadero, the southern-most traffic couplet is proposed to be closed to vehicle traffic and would be reconstructed to accommodate the multi-use trail and a new formal plaza area just north of the Pergola. The northerly traffic couplet of El Embarcadero would be widened by two feet toward the Lakeview Branch Library to safely accommodate two-way traffic. The northerly traffic couplet would be configured with two eastbound lanes and one westbound lane. A new traffic signal would be installed at Lakeshore Avenue. Typical construction activities would include clearing, grading, excavating, concrete placement, paving and replanting of landscaping using various pieces of construction equipment and by hand labor.

(5) Pergola and Colonnade. The Lake Merritt Pergola and Colonnade (Pergola) are located off of Lakeshore Avenue on the northern part of Lake Merritt, as shown in Figure III-1. Improvements to the Pergola include structural work, waterproofing, re-roofing, and painting. These improvements were completed in December 2006. As such, they are part of the existing setting with respect to this EIR's analysis.

(6) E. 18th Street Pier. The E. 18th Street Pier is located on Lake Merritt at the intersection of Lakeshore Avenue and E. 18th Street. The steps from the pier to Lake Merritt are currently in disrepair and are fenced off to prevent public access to the water. As part of Measure DD implementation, the pier is proposed to be renovated to incorporate part of its original design and restored as an overlook point on Lake Merritt. Construction activities would include concrete work and pile driving.

(7) Landscaping Improvements. Approximately 9 acres of existing planting and irrigation are proposed to be renovated along Lakeshore Avenue. This renovation would include removing approximately 24 existing trees and planting approximately 135 new trees. The final numbers of trees removed or planted may differ slightly from these counts. As part of the project design process the City hired a certified arborist to evaluate the trees proposed for removal around Lakeshore Avenue. The arborist recommended preserving one tree in this area by relocating it. The City has incorporated

this recommendation into the project. The arborist's report is provided in Appendix I. The trees would be removed because they are diseased, have severe structural defects, are crowding buildings, conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy. Landscaped areas with shrubs and ground cover would replace the existing lawn in narrower parts of the park corridor. This substitution would reduce maintenance and water use and reduce the attractiveness of the area to Canada geese. Hardscape development, including benches and patios, would be added at creek nodes and areas where small peninsulas jut out into the Lake. Figure III-7 shows a proposed landscaping plan, which indicates where trees would be removed and new trees would be planted.

d. Lakeside Drive and Municipal Boathouse (1d). Improvements to Lakeside Drive and the Municipal Boathouse along the western edge of the Lake are proposed as part of Measure DD implementation.

(1) Lakeside Drive. Lakeside Drive is a four-lane road along the west side of Lake Merritt. Lakeside Drive is proposed to be restriped from four lanes to two lanes for vehicle traffic and would include a five-foot-wide Class 2 bike lane from 14th Street to Grand Avenue. Oak Street would transition from four lanes to two between 13th and 14th Streets. A multi-use path, similar to that created on Lakeshore Avenue, would be created on the east side of Lakeside Drive. The pathway would be a continuous, 10- to 15-foot-wide decorative concrete multi-use trail with a 3.5-foot-wide decomposed granite jogging trail installed along the east side of the sidewalk on Lakeside Drive. A grand stairway leading from Lakeside Drive to the Municipal Boathouse would be constructed as part of the proposed project component. New seating areas would be developed along the multi-use trail. Pedestrian improvements include bulb-outs on Lakeside Drive at the mid-block crossing in front of the Scottish Rite Center and at 17th Street. Curb ramps that comply with the ADA would be installed as required.

(2) Municipal Boathouse. The Municipal Boathouse (Boathouse) is located on the western shore of Lake Merritt at 1520 Lakeside Drive, as shown in Figure III-1. The Boathouse is a two story mission-style structure with stucco on the exterior of the building and a tile roof. The Boathouse includes a dock. It would be converted from an office facility and would undergo major improvements including seismic retrofitting. The upper levels of the renovated Boathouse would provide space for a restaurant, a café and a meeting room. On the lower levels, boating facilities would be upgraded to meet current use requirements. Interior demolition and asbestos/lead paint abatement work for the Boathouse has been completed. The Boathouse is currently vacant, and exterior renovations and repair began in September 2006. A conceptual plan of the Boathouse and the park improvements is shown in Figure III-8.

Existing parking facilities at the Boathouse are proposed to be relocated and consolidated into a 28-space parking lot in the existing lawn area north of the Boathouse. The number of on-street parking spaces on Lakeside Drive would be increased by constructing a median and moving the curb. Drainage from the site north of the Boathouse, including the new parking lot and related driveways, would be channeled into a bio-swale in order to reduce contaminants in stormwater that drains into the Lake. The existing restroom building located adjacent to the Boathouse would be removed and a new restroom building would be constructed further south as part of the 12th Street project. Typical construction activities would include clearing, grading, excavating, pile driving, concrete placement, paving and replanting of landscaping using various pieces of construction equipment and by hand labor.

Tree #	Removal Approved	Tree Not Protected-Removal Allowed	Preservation Required	Species	dbh (Inches)	Reason for Removal / Tree Condition Comments
35a		x		Cherry	2	Dying / Cracked trunk, extensive canopy dieback
35b		x		Cherry	2	Poor health / Canopy dieback
35c		x		Cherry	2	Dying / Trunk loose in soil, extensive canopy dieback
35d		x		Cherry	2	Dead
35e		x		Cherry	2	Dead
35f		x		Cherry	2	Dead
35g		x		Cherry	2	Poor health / Canopy dieback, dead cambium near turf
47	x			Incense Cedar	30	Crowding and screening Pergola
58			x	Pine spp.	18	
62	x			Chinese Elm	24	Crowding and screening Pergola
65			x	Monterey Pine	36	
66		x		Red Horsechestnut	4	Damaged / Trunk 75% girdled near turf
67		x	x	Red Gum	30	Applicant agreed to preserve tree
68				Bronze Loquat	12	Tree failed in New Year's storm
69	x			Cherry	10	Hazardous / Trunk cavity at grade with yellowjacket next
71				Blackwood Acacia	36	Tree failed in New Year's storm
72			x	Swamp Mahogany	30	
74		x		Big Leaf Maple	2	Damaged / Trunk 50% girdled at base
78				Blackwood Acacia	30	Tree failed in New Year's storm
79				Blackwood Acacia	36	Tree failed in New Year's storm
84		x		Big Leaf Maple	2	Damaged / Trunk 40% girdled at base
86			x	Poplar	42	
89			x	Monterey Pine	36	
91	x			Monterey Pine	36	Dying / 4"+ deadwood, canopy flagging
92	x			Bottle Bush	6+4+2	Poor condition / One stem is dead, second stem is decayed
95			x	Poplar	42	
99	x			Monterey Pine	44	Dying / 6" deadwood, sparse canopy, 12"girdling root at base
100		x		Bottle Bush	3+2+2	
101			x	Monterey Pine	20	
102	x			Monterey Pine	30	Dying / 2-3" deadwood, declinging canopy
105		x		Oak spp.	2,5	Damaged / 50%+ girdled at base of trunk
106		x		Idaho Locust	5	Poor structure
107		x		Idaho Locust	6	Dead
108		x		Blue Gum	32	Hazardous / Tree Services recommends removal
110		x		Swamp Mahogany	30	Hazardous / Tree Services recommends removal
111	x			Fern Pine	9	Lakeshore Avenue reconfiguration
8 trees - removal approved						
17 trees - not protected, removal allowed						
8 trees - preservation required						

LSA

FIGURE III-7

TREE WILL REMAIN
TREE WILL BE PRESERVED
TREE WILL BE REMOVED
PROPOSED TREE

0 160 240
FEET

Oakland Measure DD
Lakeshore Avenue/El Embarcadero/Pergola
Landscape Plan

SOURCE: WALLACE, ROBERTS & TODD, MARCH 2006
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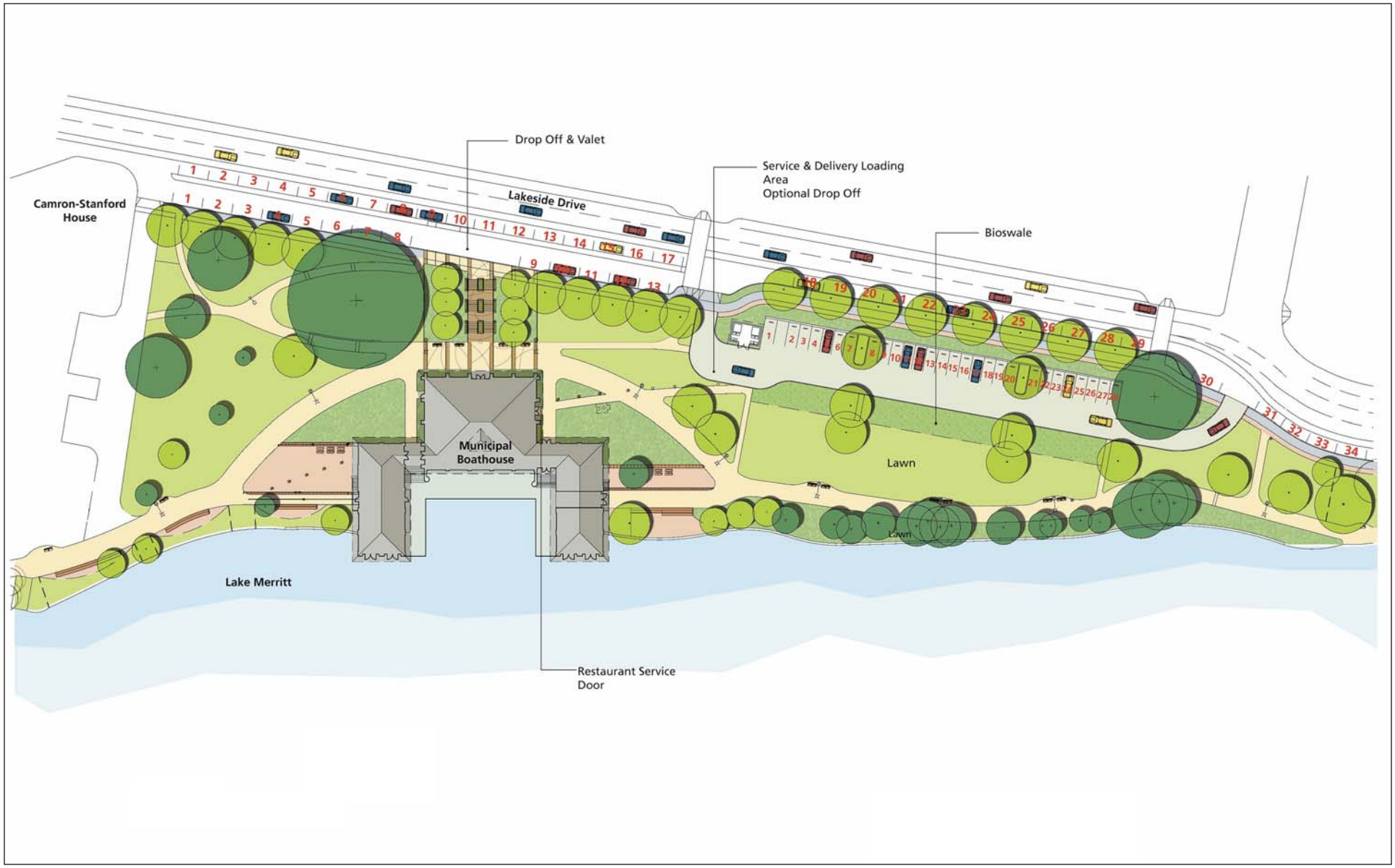


LSA

FIGURE III-8

N

0 60 120

FEET

Oakland Measure DD

Lakeside Drive and Municipal Boathouse Conceptual Plan

SOURCE: WALLACE, ROBERTS & TODD, JANUARY 2006

I:\RAJ0601 measure dd\figures\EIR\Fig_III8.ai (7/1/07)

Approximately 4 acres of existing planting and irrigation are proposed to be renovated along Lakeside Drive and around the Boathouse. This renovation would include removing approximately 20 existing trees and planting approximately 65 new trees. The final numbers of trees removed or planted may differ slightly from these counts. The trees would be removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees that have reached the end of their life expectancy. Figure III-9 shows the proposed landscape plan, which indicates where trees would be removed and new trees would be planted.

e. Snow Park and Lakeside-Harrison-20th Street Intersection (1e). Snow Park and the Lakeside-Harrison-20th Street intersection are located on the west side of Lake Merritt, north and west of the Municipal Boathouse. This proposed project component would reconfigure the street system in the vicinity of Snow Park. Lakeside Drive would be narrowed from four travel lanes to two between 14th and 17th Streets and between 19th and 20th Streets. Between Lakeside Drive and Harrison Street, 20th Street would be removed and converted to parkland. The intersection of Harrison Street and Lakeside Drive would be reconfigured to form a perpendicular "T" intersection. Typical construction activities would include clearing, grading, excavating, concrete placement, tree removal, paving and replanting of landscaping using various pieces of construction equipment and by hand labor.

From the new intersection of Harrison Street and Lakeside Drive to Grand Avenue, Harrison Street would be reduced to three lanes in the southbound direction, which would allow the construction of a new southbound bicycle lane between Grand Avenue and Lakeside Drive. Other proposed bicycle lane improvements would include a new northbound bicycle lane from 17th to 19th Streets; new bicycle lanes in each direction from 19th Street to 20th Street; and a new multi-use path on the lake side of Lakeside Drive and Harrison Street.

Additional proposed details for the project component would become available as engineering design progresses. The design process would include construction staging and management plans, transit accommodations, a demolition plan, a detour plan for both automobiles and pedestrians, a dust abatement plan, a construction noise plan, an erosion control plan and other engineering requirements in compliance with the City's standard conditions and practices.

f. Bellevue Avenue Redesign, Children's Fairyland and the Sailboat House (1f). A number of proposed improvements are at the north end of Lake Merritt including the redesign of Bellevue Avenue and the renovation of Children's Fairyland and Sailboat House.

(1) Bellevue Avenue. Bellevue Avenue is a two-lane one-way road that follows along a portion of the northern part of Lake Merritt. Portions of this road are proposed to be widened by approximately 11 feet to accommodate diagonal parking that is being relocated from the Sailboat House parking lot. Widening may require removal of some existing trees. Lighting and landscaping would be improved and sidewalk bulb-outs at intersections would be incorporated to improve pedestrian crossings. A parallel pedestrian path would be provided and the Grand Avenue intersection with Bellevue Avenue would be narrowed to one lane to improve pedestrian conditions. Fire hydrant improvements are proposed throughout Children's Fairyland, Bellevue Avenue, and the Sailboat House areas.

(2) Children's Fairyland. Children's Fairyland is located on the northern portion of Lake Merritt, near the intersection of West Grand Avenue and Bellevue Avenue, as shown in Figure III-1.

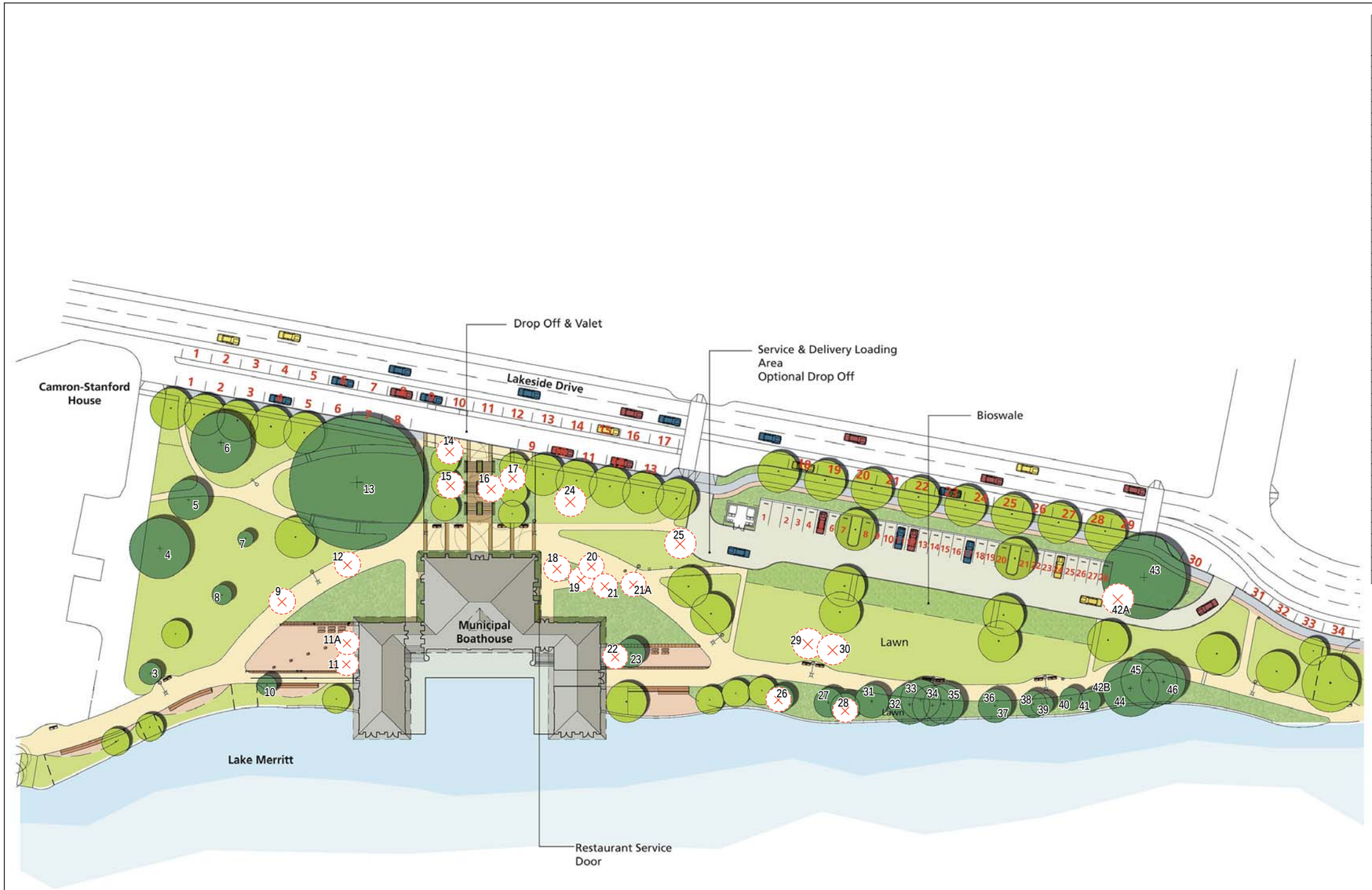
Proposed renovation would include the implementation of a facility master plan for Children's Fairyland, which includes the construction of a new pavilion for theatre presentations and special events, renovation of the puppet theatre, improvements to the Grand Avenue entry, refurbishment of sets, and repair of site drainage system. Some of the proposed alterations have already been completed.

(3) Sailboat House. The Sailboat House is located off of Bellevue Avenue on the northern shore of Lake Merritt. It accommodates recreational programs, boat storage, meeting rooms and other public uses. The Sailboat House is a two-story, wood structure with several associated boat ramps and docks. The facility's parking lot is located northeast of the Sailboat House and several small outbuildings are located between the Sailboat House and Bellevue Avenue. The building was extensively remodeled in the 1950's, which masked the original mission-style architecture (similar to the Municipal Boathouse) and created a larger, enclosed second story on the structure. Measure DD funds would be used to renovate the Sailboat House. The extent of the Sailboat House renovations is uncertain at this time, but could range from repainting and minor upgrades of the existing structure to renovation of the structure to reveal its historic character. Improvements would be made to the seawall, shoreline, and landscaping, and the parking lot would be reduced in size and reconfigured.

g. Water Quality Control Measures and Other Improvements (1g). Water quality improvement is one goal of Measure DD. Water quality control measures, as well as other improvements proposed for Lake Merritt and Lake Merritt Channel as part of Measure DD, are described below.

(1) Water Quality Control Measures. Water quality improvement is an important goal of Measure DD. Section 303(d) of the federal Clean Water Act (CWA) requires States to identify waters that do not meet prescribed water quality standards. Lake Merritt is a 303(d) listed impaired water body due to trash and organic enrichment and low levels of dissolved oxygen. Activities under the Lake Merritt Water Quality Program that could be funded under Measure DD include:

- **Cessation of bird feeding at Lake Merritt** – Install signage to prohibit bird-feeding at Lake Merritt, in part to discourage Canada geese from congregating excessively at the Lake. The droppings generated by Canada geese partly contribute to the nutrient load in the Lake.
- **Circulators** – Install circulators, which bring water from the bottom of the water column to the surface. This movement of water continually oxygenates the water column.
- **Bubbler and Air Diffusers** – The bubbler technology being considered for Lake Merritt would consist of approximately 150 diffusers distributed in a grid pattern throughout Lake Merritt. The diffusers would be spaced approximately 100 feet on-center along eight hose lines. These diffusers would emit a constant stream of air from the lake bottom, boiling up to the surface to create vertical mixing of the lake water. Eight compressors, requiring 2 kilowatts of energy each, would be located along the shoreline. Each compressor would be turned on and off as needed.
- **Aeration Fountains** – Install fountains. Spray from the fountains absorbs oxygen that is released when the droplets strike the surface.
- **Restorer Technology** – Install restorer technology, which uses artificial and living substrates to create a floating island of ecological activity for enhanced filtration.



Tree #	Removal Approved	Preservation Required	Species	dbh (inches)	Reason for Removal / Tree Condition Comments
7		x	Willow	14	
8		x	Willow	18	
9	x		Willow	>9	Grading
11	x		Australian Tea Tree	>9	Foundation work on building / Trunk decay
11A	x		Australian Tea Tree	>9	Foundation work on building
12			Willow	18	Not a tree. It's a stump.
14	x		Willow	18	Stairway construction
15	x		Willow	20	Stairway construction
16	x		Malus spp.	>9	Stairway construction / Conk on one stem
17	x		Malus spp.	>9	Stairway construction / Cavity, decayed stems
18	x		Victorian Box	48	Fruit drop, inappropriate for restaurant entrance
19	x		Brush Cherry	48	Fruit drop, inappropriate for restaurant entrance
20	x		Brush Cherry	44	Fruit drop, inappropriate for restaurant entrance
21	x		Brush Cherry	20	Fruit drop, inappropriate for restaurant entrance
21A	x		Brush Cherry	>9	Fruit drop, inappropriate for restaurant entrance
22	x		Hollywood Juniper	26	Too close to building, blocks views
23		x	Hollywood Juniper	26	
24	x		Willow	26	Grading / Trunk cavity, decay
25	x		Willow	18	Driveway construction
26	x		Australian Tea Tree	24	Lake edge retaining wall repair
27			Australian Tea Tree	26	
28	x		Australian Tea Tree	26	Lake edge retaining wall repair
29	x		Victorian Box	24	Bioswale and grading
30	x		Victorian Box	32	Bioswale and grading / Co-dominate stem and included bark
31		x	Australian Tea Tree	30	
32		x	Australian Tea Tree	36	
33		x	Australian Tea Tree	36	
34		x	Australian Tea Tree	36	
35		x	Australian Tea Tree	36	
36		x	Australian Tea Tree	30	
37		x	Australian Tea Tree	20	
38		x	Australian Tea Tree	24	
39		x	Australian Tea Tree	20	
40		x	Australian Tea Tree	>9	
41		x	Australian Tea Tree	20	
42A	x		Monterey Pine	50	New parking lot and driveway
42B		x	Monterey Pine	18	
43		x	Poplar	75	
44		x	Poplar	55	
45		x	Poplar	50	
46		x	Poplar	40	
20 trees - removal approved					
20 trees - preservation required					

LSA

TREE WILL REMAIN
TREE WILL BE REMOVED
PROPOSED TREE
11A TREE NUMBER

0 60 120
FEET

[NOTE: MINOR CHANGES MAY BE MADE TO THE LAKESIDE DRIVE AND MUNICIPAL BOATHOUSE LANDSCAPE PLAN]

SOURCE: WALLACE, ROBERTS & TODD, MARCH 2006
I:\RAJ0606 measure dd\figures\EIR\Fig_III9.ai (7/1/07)

FIGURE III-9

Oakland Measure DD
Lakeside Drive and Municipal Boathouse
Landscape Plan

- **Biofiltration Techniques** – Install biofiltration basins, infiltration ponds, swales and/or constructed wetlands to promote nutrient cycling and removal, reduce suspended and total dissolved solids, and promote the production of oxygen. These landscape features can also enhance wildlife habitat.
- **Stormwater separators on City stormdrains** – Install separators, which are flow-through devices placed within stormdrain systems with a separation unit to remove sediments and/or trash. At the tidally influenced Lake Merritt, tide flaps are being considered at the end of culverts. Tide flaps allow storm water runoff into the Lake, but prevent tidal flows from entering into the City's drainage system.
- **Drain inlet inserts** - These are used to capture sediments, litter and organic debris. Drain inlet inserts generally take the form of either: baskets, boxes, fabrics, media filters, and screens.
- **Netting Trash Trap** – Install nets, which are placed at stormwater outfalls and channels, to capture trash and organic materials prior to entering a water body.
- **Booms** – Install floating booms in association with stormwater outfalls and channels, to capture trash and organic materials after entering water body.

(2) Other Lake Merritt Improvements. Many retaining walls surrounding Lake Merritt are cracking or are in poor condition including those at the Sailboat House, Municipal Boathouse and E. 18th Street overlook pier. With Measure DD funding, improvements to these walls may include reconstructing or strengthening foundations, providing shoring to brace the retaining walls, installing drainage measures around the walls to prevent erosion, or restoring wall surfaces. Temporary cofferdams and dewatering may be required in some locations to provide access to the retaining walls. Some reconstruction and restoration of the retaining walls has been completed. Additional work would be implemented as part of specific project components, such as the proposed renovation of the Municipal Boathouse.

2. Oakland Waterfront Trail and Access Improvements (Group 2)

The Oakland Waterfront Trail is part of the San Francisco Bay Trail, a planned 400-mile network of bicycle and hiking trails that will form a continuous ring around the Bay. Measure DD implementation is intended to help close the gaps in a 6.6-mile portion of the trail between Jack London Square and 66th Avenue. Measure DD funds are allocated for property acquisition, environmental cleanup, and trail and park construction along the waterfront. A sufficient level of detail is known about these proposed components, enabling a project level analysis of these components within the EIR, as described in Chapter I, Introduction.

Properties along the waterfront designated for parkland development are proposed to be acquired and remediated, as needed, with Measure DD funding. The sites would be remediated before the proposed trail facilities would be constructed. Cleanup plans would be developed for each site where sampling results show that soil or groundwater is contaminated above risk-based clean-up standards. Prior to implementation of cleanup, the plans would be reviewed by the agency with regulatory oversight of the cleanup, such as the San Francisco Bay Region, Regional Water Quality Control Board (Water Board). As part of the Water Board's review process the draft cleanup plans are circulated to interested persons, who are provided an opportunity for comment on these documents. Such plans would specify measures to be taken to remediate the site and to protect workers, the public and the

environment during remediation. Contamination may be excavated and disposed of at an approved landfill facility, capped in place or otherwise remediated, as appropriate. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency. A remediation plan has been prepared and approved for the Cryer Site, which is one of the contaminated sites along the Waterfront Trail.

a. General Trail Characteristics. Most of the 6.6 miles of trail would be paved with asphalt or concrete, with minimal grading so as to minimize disturbance of the ground surface. At some locations, invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. Some portions of the existing Bay Trail between Jack London Square and 66th Avenue may be repaired to fix broken pavement, lighting, or signage. The trail would vary from a minimum 12-foot-wide combined use trail where space is constrained to a pair of bike and pedestrian trails separated by a landscaped median, with a total width of up to 40 feet. At points of interest, additional landscaping would be planted. Various types of decorative and informational wayfaring signage would be installed along the trail.

b. Site-Specific Improvements. Specific improvements proposed as part of Measure DD for the Waterfront Trail are described below. The locations of these project components are shown in Figure III-10a and III-10b.

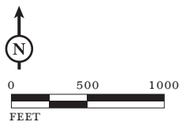
(1) Estuary Park. Estuary Park is an existing 7-acre park located on the northern bank of the Lake Merritt Channel where the channel merges into the Oakland Estuary. This park includes boat ramps, an existing play field, hardscape with a seating area, and the Jack London Aquatic Center building. As part of the Oak to Ninth Avenue Project (approved by Oakland City Council in 2006), changes were proposed to the Estuary Park and the adjoining Cash and Carry Warehouse site. These changes include re-vegetation of the 3.5-acre lawn/play field, shoreline protection, and improvements to the Bay Trail. Demolition and/or development of the Cash and Carry Warehouse site are the obligation of the Oak to Ninth Avenue Project as well. Measure DD-funded actions would include trail improvements, park landscaping renovations, minor improvements on the Port's trail from Alice Street to Estuary Park, provision of access along the water's edge, and redesign of parking.

(2) 10th Avenue Marina. The Bay Trail already exists at this location. Proposed work would consist of minor upgrades to the trail width, paving and incorporation of sign and trail markers.

(3) Brooklyn Basin. The Brooklyn Basin property is located on the waterfront adjacent to the Oakland Estuary, and is bound by the Brooklyn Basin waterway to the southwest, Embarcadero Way to the northeast, a boat retail facility to the northwest, and a hotel to the southeast. This site is one of the few vacant sites along the waterfront, and provides a visual connection to the water from the freeway and adjacent neighborhoods.

The site is owned by the Port of Oakland (Port). Lead contaminated soil has been identified on the site. Currently the Port is negotiating with a developer for the site. BCDC would require the developer to construct the trail on the property. If negotiations are unsuccessful, the City would repair or replace the failing seawall, remediate the soil, and install the Waterfront Trail and landscaping.

LSA



LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

FIGURE III-10a

Oakland Measure DD
Waterfront Trail North

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
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Exhibit 6b: City of Oakland Measure DD Implentation Project Final
Environmental Impact Report, adopted February 13, 2008

LSA

FIGURE III-10b

N

0 500 1000
FEET

PROJECT AREA FOR WATERFRONT TRAIL GROUP

Oakland Measure DD
Waterfront Trail South

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
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(4) Brooklyn Basin to Embarcadero Cove. There is an existing segment of the Bay Trail between Brooklyn Basin and Embarcadero Cove. Signage and trail markers would be incorporated into this portion of the trail. A better connection would be made at the Harbor Master's Office, and the pathway improved through the Embarcadero Cove complex.

(5) Livingston Pier. Livingston Pier is located at the terminus of Livingston Street, north of the bridge to the Coast Guard Island. The pier is currently leased by the Port to Vortex Diving through 2011 and is not currently open to the public.

A very short section of the Bay Trail would run across the entry to the pier. Long-term plans for the pier could include the use of the structure on the pier for recreational/retail uses with the trail wrapping around the perimeter of the pier. Standard signage and lighting would be incorporated.

(6) Cryer Site. The Cryer Site is located at the corner of Embarcadero and Dennison Street, and borders the Estuary to the west. The site is composed of two separate properties: the Cryer Boat Yard Property (approximately 1.0 acres), and the Steam Valve property (0.6 acres). For purposes of this EIR, both parcels together will be considered the Cryer Site. All structures on the Cryer Boat Yard Property have been demolished; the Steam Valve property has one large building on the northern portion of the site.

Soil investigations concluded that the site contains soil contaminated with metallic slag. Sediment sampling below the low tide line showed contamination with hydrocarbons and heavy metals. A Final Corrective Action Plan (CAP) was prepared and submitted to the Water Board in March 2007. The Final CAP proposes excavating approximately 3,250 cubic in-place yards of slag and contaminated soil and capping the site with clean soil and/or concrete design elements where some slag materials may remain on-site to prevent exposure. Excavated materials would be transported off site for disposal at a permitted facility. The Final CAP has been approved by the Water Board.

Proposed improvements to the Cryer Site are considered a second phase to the Union Point Park. Possible improvements for this property could include a connection to the Waterfront Trail, a park area, parking, beach restoration, pier replacement, and potentially converting the building for community use.

(7) Union Point Park. The Union Point Park is a 9-acre park located at 2311 Embarcadero East between Dennison and Kennedy Streets. The park includes picnic and barbeque facilities, a children's play structure, parking area, restrooms, water fountains, an expansive lawn, and a connection to the Bay Trail. The construction of Union Point Park was completed in 2005.

(8) Union Point Park to Park Street Bridge. A trail easement would be acquired from the property owners and a trail constructed along the shoreline.

(9) Bridges at Park Street, Fruitvale Avenue and High Street. Four bridge crossings have been proposed to continue the Bay Trail along the Oakland Estuary: the Park Street Bridge, the Fruitvale Avenue Bridge, Fruitvale Avenue Railroad Bridge, and the High Street Bridge. The preferred plan for these bridge crossings is for the trail to pass under the bridges on pile-supported, elevated pathways. This would allow trail users to pass the existing bridges without grade-level auto traffic conflicts. The proposed trail would cross under the bridge abutments and over water. The

existing bridge fender system would be demolished and replaced with a new one. Pile driving would likely occur during construction.

Trail sections at bridge crossings would be 12-foot-wide solid decking supported by concrete piers set in pairs approximately 30 feet on center. Columns would be 18 inches square drilled or driven to a depth of up to 30 feet on land and 24 inches square embedded up to 40 feet below the mudline where the path occurs over water. Sections under bridges would be covered with a protective roof to prevent injury to trail users from objects falling from the bridge or bridge deck. The transition from the shore side trail to the bridges would be above grade trails. The approximate total length of these trail sections would be 1,400 feet. To the extent feasible, the over water sections would not extend beyond the existing pierhead line or into tideland area. Only the elevated trail sections leading to the bridges may extend over tideland area.

(10) Park Street Triangle. The Park Street triangle is currently occupied by a 7-11 and Nikko's Family Restaurant. This site is a gateway to the waterfront for travelers along 23rd Avenue and Park Street Bridge. Measure DD funded a traffic study of potential street realignments and Bay Trail construction at this location. Any further work would be funded by other sources and undergo a separate CEQA process.

(11) Derby Avenue to Lancaster Street. Derby Avenue and Lancaster Street are the only streets between the Park Street Bridge and the Fruitvale Bridge that terminate at the waterfront. The terminus of these streets at the waterfront would include pocket parks, providing observation areas along the waterfront. A trail would connect the parks and run behind the Oakland Museum Women's Board warehouse. The two parks would include landscaping, special paving, seating, and a terraced slope down to the water's edge.

The trail would be constructed along one block between Derby Avenue and Lancaster Street for 400 feet. Approximately 160 feet would consist of engineered trail on top of an existing sheet pile wall. The remaining 240 feet would be a pile-supported trail cantilevered over an existing rock slope, which would remain in place. Pile driving would be required to install the new trail.

Phase II soil testing is complete, and no serious contamination was found. An easement agreement has been reached with the Oakland Museum Women's Board for the trail between the two parks.

(12) Alameda Avenue South of Fruitvale Avenue. This proposed segment of the trail extends southeast of the Fruitvale Bridge along Alameda Avenue. It would include the installation of 800 feet of standard concrete trail along with landscaping, signage, and trail markers. The existing traffic lanes would be narrowed and Class II bike lanes added in each direction.

The Phase II environmental testing is complete, and no serious contamination was found.

(13) US Audio/Capture Technologies and Friendly Transportation Trail Connection. As part of the Measure DD Implementation Project, construction of the Waterfront Trail is proposed across these properties. The trail would be partially pier-supported, which would require pile driving to construct. An easement for access to the trail across these properties is currently being sought.

(14) Gallagher & Burk/Hanson Aggregate Trail Connection. The proposed segment of the trail adjacent to the Gallagher & Burk asphalt plant would be a concrete pier supported walkway. As the Hanson Aggregate facility uses water access for delivery of materials, the trail would be designed to allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail. Property easements are being sought for this segment of the trail. An interim route may include a connection to Tidewater Avenue.

(15) 66th Avenue Gateway. Sixty-Sixth Avenue would serve as a major gateway to the waterfront and provide a visible connection between neighborhoods and the waterfront. Decorative columns may be installed along 66th Avenue to announce the entry way. A boardwalk would extend from the gateway area and existing trail to an overlook near the shoreline, with terraced fill stepping down from the trail to the shoreline, providing a site for public art sculptures. Native landscaping would be installed. The existing parking area across Oakport Street may be upgraded and expanded. Construction would not extend into existing marsh habitat. A fenced buffer of upland habitat at least 20 feet wide would be set up between marsh habitat and any nearby construction areas. This proposed project component has been designed and the City is currently requesting bids to construct it. Mitigation measures included in this environmental document has been incorporated into the bid documents.

3. North and East Oakland Recreational Facilities (Group 3)

The two proposed components within this group are the renovation of the historic Studio One Art Center, located in North Oakland and the construction of an East Oakland Aquatic, Sports and Recreation Complex (East Oakland Sports Complex). A description of these facilities is presented below, and the locations of these facilities are shown in Figure I-2. Given the uncertainty regarding the design, construction, and other details regarding the East Oakland Sports Complex, this proposed component is evaluated at a program level.

a. Studio One Art Center. Studio One is a 22,000-square-foot art and culture center located at 365 45th Street. The building requires extensive seismic reinforcement, new heating, ventilating, lighting, and plumbing systems, plus interior and exterior finish work. Renovation is intended to improve accessibility and functionality and provide maximum flexibility and public safety, while preserving the Studio One's non-institutional atmosphere and historic façade.

Much of the reconstruction work for Studio One has been completed, including the asbestos and lead paint abatement. Work on the building is expected to be completed in summer 2007.

b. East Oakland Aquatic, Sports and Recreation Complex. The East Oakland Sports Complex site is located in East Oakland at the Ira Jinkins Park at Edes and Jones Avenues. The proposed project component would include a 150,000 square foot addition to and expansion of the existing Ira Jinkins Park/Recreation Center. The facility would likely include a 25-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley. Grading and excavation for foundations and removal of some ornamental trees would be required to construct the new facilities. Measure DD funds have been allocated toward this project component, but additional funding must be secured before the project component can move forward. It is likely that this component would be constructed in phases as additional funding is secured.

4. City-wide Creeks Restoration, Preservation and Acquisition (Group 4)

Oakland's watershed has fifteen main creeks with over thirty tributaries that comprise over 40 miles of open creeks. As part of Measure DD funded activities, the City would restore, preserve and/or acquire various targeted creek sites as shown in Figure I-3. The intent of the restoration is to improve water quality, hydrology and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship. Specific activities may include creek bank stabilization, riparian habitat restoration, hydrology restoration, public education displays, erosion control, and introduction of native wildlife. Creeks specifically called out in Measure DD are Sausal Creek, Lion Creek, Palo Seco Creek, Cinderella Creek, Arroyo Viejo Creek, Shepherd Creek, Glen Echo Creek, Temescal Creek, Coliseum Slough, Horse Shoe Creek, San Leandro Creek, Peralta Creek, and Courtland Creek. All work would be accomplished in accordance with the City's "Creek Protection, Stormwater Management and Discharge Control Ordinance." The CEQA analysis for these proposed components of Measure DD implementation is at a program level as final selection of specific sites has not occurred.

a. Creek Restoration Activities. The proposed Measure DD funded creek restoration activities are intended to improve water quality and to enhance habitat for avian, fish, invertebrate, and insect populations through the creation of native plant communities, improved aquatic environments, and increased diversity of landscape types. Restoration would incorporate existing resources at creek sites to the extent feasible and would preserve and protect special-status species, if present. Existing habitat and vegetation to be preserved, including special-status plant species, would be identified by conducting site surveys before or during the design phase. The creeks on which restoration is contemplated include: Sausal Creek, Lion Creek, Palo Seco Creek, Cinderella Creek, Arroyo Viejo Creek, Shepherd Creek, Glen Echo Creek, Temescal Creek, Horse Shoe Creek, San Leandro Creek, Peralta Creek, Courtland Creek, and Coliseum Slough.

Restoration activities under Measure DD could include the following:

- Demolition of existing hardscape
- Demolition and construction of water diversion structures to and from bypass channels
- Realignment of existing utilities
- Grading, clearing and grubbing of existing landscaped areas
- Tree pruning and removal
- Control and removal of undesirable plant species
- Creek bed grading
- Creek realignment
- Removal of underground culverts and re-establishment of open creek channel
- Culvert/concrete channel alternations, repair and replacement
- Toe stabilization utilizing biotechnical engineering techniques and hard engineering solutions including but not limited to rip rap, boulder placement, root wads, gabions, and reinforced walls
- Slope stabilization utilizing biotechnical engineering techniques and hard engineering solutions including but not limited to brush layering, brush mattresses, fascines, crib walls, retaining walls, live stakes and plantings

- In-stream improvements including but not limited to riffles, check dams, pools, fish ladders, weirs, and dikes
- Planting and irrigation
- Access improvements including but not limited to pathways, bridges, stairs, boardwalks, ramps, overlooks, benches, tables, and fences
- Educational elements including but not limited to signage, outdoor seating areas, scopes, interpretive art, kiosks, and viewing platforms
- Reduction of vehicular and/or pedestrian access to some project areas
- Restoration to more stable hydrology
- Volunteer weed abatement, native planting propagation and plantings

b. Creek Property Preservation and Acquisition. The proposed Measure DD funded creek preservation and acquisition activities would enable the City and its partners to protect ecologically valuable lands in and around Oakland's waterways. Preservation of creek areas would improve water quality, create new open spaces and recreational opportunities, and protect special wildlife habitats and unique natural resources.

The principle tools that could be implemented with Measure DD funding include the following:

- City partnership with the private sector to protect creek property within proposed development plans,
- Conservation easements either obtained through purchase or donation, and
- Acquisition of Fee Simple Title either through purchase or donation.

c. Specific Creek Improvements. Specific creek restoration/acquisition activities that have been proposed under Measure DD are outlined in Table III-2.

D. DISCRETIONARY ACTIONS

The Measure DD Implementation Project would require discretionary actions that include but are not limited to: Design Review and Conditional Use Permits; Tree Removal Permits; Subdivision; Grading Permits; Land Acquisition & Condemnation; Creek Permits; and Encroachment Permits.

E. USE OF THIS EIR

A number of permits and approvals, including discretionary actions listed above, would be required for the project. As lead agency for Measure DD implementation, the City of Oakland would be responsible for the majority of the approvals required for implementation of the project. Other agencies may have some authority related to the project and its approvals. A non-exclusive list of the required permits and approvals that may be required by the City and other agencies is provided in Table III-3. This EIR is intended to be used for all discretionary approvals required by the City and other agencies in connection with the project. This includes funding decisions on grants, etc., which are not included on this list.

Table III-2: Proposed Creek Restoration and Preservation Components

Creek Area	Activity
Arroyo Viejo Creek Restoration at Knowland Park	Remove non-native vegetation, implement bank stabilization, restore native habitat, and install outdoor "classroom" patios with interpretative signage on watershed ecology
Sausal Creek Restoration, Dimond Park	Remove failing concrete spillway, repair eroding banks, create new trout habitat, possible daylighting a portion of creek in Dimond Park, and possible tree removals
Shepherd Creek at Shepherd Canyon Park	Stabilize creek banks, install bioengineering to address erosion, install berms to prevent flooding to field, create expanded wetland and native plant area, and expand footbridge
Claremont Creek Garber Park	Restore creek banks, revegetate with riparian plants, and create public access and recreational opportunities
Lion Creek at Lion Crossings Park	Create new creek/tidal channel with native riparian and wetland habitat areas
Peralta Creek, Butters Canyon	Develop and implement revegetation/restoration plan for lots previously acquired by Butters Land Trust and additional lots purchased and/or preserved via conservation easements by the City of Oakland
Glen Echo Creek at Oak Glen Park	Revegetation, bank stabilization, and increase flood detention capacity
Courtland Creek, Courtland Creek Park (between Brookdale and Fairfax Avenues)	Remove non-native vegetation, open up view of the creek, restore native plants, and implement bank stabilization
Temescal Creek Restoration at North Oakland Sports Field (SE of Hwy 13/24 interchange)	Riparian restoration at the City owned North Oakland Sports Field to enhance habitat function and educational opportunities
Horseshoe Creek Restoration/Leona Open Space (Between Redwood Rd. and Merritt College)	Remove a long concrete channel and implement restoration measures and trail improvements
Palo Seco Daylighting at Joaquin Miller Park	Daylight (remove from underground culvert) 1,000 feet of streambed, restore riparian habitat, retain existing picnic areas and provide bridges to link picnic areas to existing trails
Peralta Creek, Peralta Hacienda Park	Improve habitat and water quality along Peralta Creek in Peralta Hacienda Park, remove non-native plants and re-vegetate with riparian native plants
Coliseum Slough Restoration (between San Leandro Blvd and the Bay at the Oakland Coliseum)	Enhance habitat function, trail access to the Bay Trail, recreational facilities, and trash/debris removal at the mouth of Lion and Arroyo Viejo Creeks
Lion Creek at McCrea Memorial Park (casting ponds)	Restore channel and native habitat, improve connection between the park and the creek
Sausal Creek Restoration, Hawthorne School	Daylight creek to enhance water quality, restore native riparian vegetation, create a new creek open space behind Hawthorne School, and connect to Sanborn Park
Sausal Creek, 27th Street at Barry Place	Revegetate creek banks and install improvements to create a new public park
Sausal Creek, Beaconsfield Open Space	Daylight creek from deteriorating culvert, restore habitat, and address severe erosion
San Leandro Creek at Sobrante Park	Restore creek by removing concrete channel and layback the north creek bank to provide flow capacity, revegetate north bank and connect creek to Park and Washington Middle School through landscaping design
Seminary Creek at Rainbow Recreation Center	Remove concrete channel and restore creek meander and riparian vegetation
Glen Echo Creek Restoration at Mosswood Park	Daylight approximately 600 feet of creek and restore to natural condition
Lion Creek at Coliseum Gardens	Construct a creek and wetland adjacent to the existing concrete flood control channel in order to restore habitat

Source: City of Oakland, Public Works Agency, 2007.

Table III-3: Required Permits and Approvals [a]

Lead Agency	Permit/Approval
City of Oakland	• Design Review • Subdivision Maps • Conditional Use Permit • Tree Removal Permits • Grading Permits • Encroachment Permits • Building Permits • Creek Protection Permit
Responsible Agencies	
Oakland Fire Services Agency	• Oversight/approval of site remediation, Site Management Plans, including: Health and Safety Plans, Soil and Groundwater Management Plans, and Hazardous Waste Disposal and Transportation Plans
Alameda County Flood Control District	• Planning approval; approval of modifications to the 7th Street pump station
Alameda County Department of Environmental Health	• Oversight/approval of site remediation, Site Management Plans including: Health and Safety Plans, Soil and Groundwater Management Plans, and Hazardous Waste Disposal and Transportation Plans
Alameda Countywide Clean Water Program	• National Pollutant Discharge Elimination System (NPDES) permit • Hydromodification Plan (HMP) for components that are greater than one-acre, not exempt by definition, not serviced by hardened enclosed stormwater conduits, and not in the proposed mapped exempt area (tidally influenced/depositional coastal area)
Bay Area Air Quality Management District	• Demolition permit for asbestos abatement
Regional Water Quality Control Board	• Section 401 Water Quality Certification (Clean Water Act) and/or Waste Discharge Requirements (Porter-Cologne Water Quality Control Act) for impacts to waters of the State • Oversight/Approval of site remediation, Site Management Plans including: Health and Safety Plans, Soil and Groundwater Management Plans, and Hazardous Waste Disposal and Transportation Plans
San Francisco Bay Conservation and Development Commission	• Regionwide, Administrative, or Major Permit (Waterfront Trail construction will likely require a Major Permit); nearly all work, including grading, on the land within 100 feet of the Bay shoreline requires a permit as does filling or dredging in the Bay
Port of Oakland	• The Port has approval authority and would issue an encroachment permit for that portion of trail that is within port jurisdiction boundary; on lands with leases to the City the trail would be constructed in accordance with the terms of the lease for the site (or the lease would be amended)
California Department of Transportation	• Encroachment permit for construction in Caltrans right-of-way
California Department of Fish and Game	• Streambed alteration permit in accordance with Section 1601 of the California Fish and Game Code

Table III-3 *Continued*

Lead Agency	Permit/Approval
California Public Utilities Commission	• Approval for construction of or changes to railroad at-grade crossings
Department of Toxic Substance Control	• Oversight/approval of site remediation, Site Management Plans including: Health and Safety Plans, Soil and Groundwater Management Plans, and Hazardous Waste Disposal and Transportation Plans
State Lands Commission	• Leases or permits for construction or dredging on State lands including navigable rivers, natural lakes, and bays
US Coast Guard	• The US Coast Guard may issue "bridge permits" for the area directly beneath bridges; the Coast Guard is also one of the agencies that comments on Army Corps Sec. 10 permits
US Army Corps of Engineers	• Clean Water Act Section 404/Section 10 permits (Section 10 applies to Waterfront Trail only) for impacts to waters of the United States • Jurisdictional Waters Determinations & Permit for Authorization for Impacts to Waters of the US
US Fish and Wildlife Service	• Consultation with Corps re: potential impacts to federally listed species as part of Section 404 permitting process (if required)
National Marine Fisheries Service	• Consultation with Corps re: potential impacts to Essential Fish Habitat (EFH) and federally listed anadromous fish (e.g., steelhead) as part of Section 404/Section 10 permitting process

Source: LSA Associates, Inc, 2007.
[a] Does not include funding/grant decisions, which also will rely upon this EIR.

IV. SETTING, IMPACTS, AND MITIGATION MEASURES

This chapter contains an analysis of each environmental topic analyzed in the evaluation of the Measure DD Project, and, as such, constitutes the major portion of this Draft EIR. Sections A through M of this chapter describe the environmental setting of the Measure DD Project as it relates to each specific environmental issue, the impacts resulting from implementation of the project, and mitigation measures, as appropriate, that would reduce impacts of the project.

DETERMINATION OF SIGNIFICANCE

Under CEQA, a significant effect is defined as a substantial, or potentially substantial, adverse change in the environment.[1] The *CEQA Guidelines* direct that this determination be based on scientific and factual data. Each impact evaluation in this chapter is prefaced by criteria of significance, which are the thresholds for determining whether an impact is significant. In accordance with Section 15022(a) of the CEQA Guidelines, the City of Oakland has drafted local CEQA thresholds and criteria of significance guidelines that are consistent with CEQA and the State CEQA Guidelines. The City's thresholds are intended to supplement provisions in the CEQA Guidelines for determining the significance of environmental effects, including Appendix G of the Guidelines. As appropriate, state and federal regulations supplement the City's local thresholds and guidelines.

ISSUES ADDRESSED IN THE DRAFT EIR

The following environmental issues are addressed in this chapter:

A. Land Use
B. Planning Policy
C. Transportation, Circulation and Parking
D. Air Quality
E. Noise
F. Biological Resources
G. Cultural Resources
H. Hydrology and Water Quality
I. Geology, Soils and Seismicity
J. Hazards and Hazardous Materials
K. Public Services and Recreation
L. Utilities and Infrastructure
M. Aesthetic Resources

[1] Public Resources Code Section 21068.

FORMAT OF ISSUE SECTIONS

Each environmental issue section has two main subsections: 1) Setting; and 2) Impacts and Mitigation Measures. Each impact and mitigation measures subsection is further divided into *Impacts and Mitigation Measures Applicable to all Project Components* and *Impacts and Mitigation Measures Applicable to Specific Project Components*. Any identified significant impacts are numbered and shown in bold type, and the corresponding mitigation measures are numbered and indented. Significant impacts and mitigation measures are numbered consecutively within each topic and begin with a shorthand abbreviation for the impact section (e.g., LAND for Land Use). The following abbreviations are used for individual topics:

LAND:	Land Use
POL:	Planning Policy
TRANS:	Transportation, Circulation and Parking
AIR:	Air Quality
NOISE:	Noise
BIO:	Biological Resources
CULT:	Cultural Resources
HYD:	Hydrology and Water Quality
GEO:	Geology, Soils, and Seismicity
HAZ:	Hazards and Hazardous Materials
PUB:	Public Services and Recreation
UTL:	Utilities and Infrastructure
AES:	Aesthetic Resources

The following notations are provided after each identified significant impacts and mitigation measure:

SU	=	Significant and Unavoidable
S	=	Significant
LTS	=	Less than Significant

These notations indicate the significance of the impact before and after mitigation.

UNIFORMLY APPLIED DEVELOPMENT STANDARD CONDITIONS OF APPROVAL

The City's Uniformly Applied Development Standard Conditions of Approval are incorporated into projects as Conditions of Approval regardless of a project's environmental determination. As applicable, the Conditions of Approval are adopted as requirements of an individual project when it is approved by the City and are designed to, and will, substantially mitigate environmental effects. For the Measure DD Project the City's Conditions of Approval have been incorporated as part of the project.

In reviewing project applications, the City determines which of the standard conditions are applied, based upon the zoning district, community plan, and the type(s) of permit(s)/approval(s) required for the project. Depending on the specific characteristics of the project type and/or project site, the City will determine which Development Standards apply to each project; for example, Development Standards related to creek protection permits will only be applied projects on creekside properties.

The Development Standards incorporate development policies and standards from various adopted plans, policies, and ordinances (such as the Oakland Planning and Municipal Codes, Oakland Creek Protection, Stormwater Water Management and Discharge Control Ordinance, Oakland Tree Protection Ordinance, Oakland Grading Regulations, National Pollutant Discharge Elimination System (NPDES) permit requirements, Housing Element-related mitigation measures, California Building Code, and Uniform Fire Code, among others), which have been found to substantially mitigate environmental effects. Where there are peculiar circumstances associated with a project or project site that will result in significant environmental impacts despite implementation of the Development Standards, the City will determine whether there are feasible mitigation measures to reduce the impact to less than significant levels.

A. LAND USE

This section describes existing land uses on and around the Measure DD Implementation Project component sites. It provides an overview of the proposed project components, describes the existing land use setting, and evaluates the compatibility of the proposed land use with existing and planned uses in the vicinity of the project. The consistency of the proposed project with local land use policies is addressed in Section IV.B, Planning Policy, of this EIR.

1. Setting

The project components of Measure DD implementation are located throughout the City of Oakland and thus occur in areas occupied by a variety of land uses. The Lake Merritt and Lake Merritt Channel group is located around the Lake Merritt area of Oakland, which is primarily used for recreation, but borders residential and commercial areas. The Waterfront Trail group is located along the Oakland Estuary between Jack London Square and 66th Avenue in areas that are primarily industrial and commercial. Studio One is located in a residential area at 365 45th Street and the East Oakland Sports Complex site is located at the Ira Jinkins Park at Edes and Jones Avenues in an area of mixed residential and commercial use. The Creek restoration and preservation activities would occur at various locations throughout the City, most of which are in residential areas or parks. Additional land use details within the project area are provided in the following sections.

a. Lake Merritt and Lake Merritt Channel (Group 1). The current land uses at Lake Merritt and immediately adjacent area are primarily open space, recreation, and roadways. The Grand Avenue and Lakeshore Avenue business districts, residential neighborhoods, and Interstate 580 (I-580) are located north of Lake Merritt. The Lakeview Branch Library is located northeast of the Pergola. Lakeshore Avenue generally forms the eastern boundary of Lake Merritt with nearby areas to the east characterized by a mix of residential, public institutional, and commercial uses. Several churches are located along Lakeshore Avenue.

Lakeside Drive and Harrison Street generally form the western border of Lake Merritt. Nearby areas to the west contain a mix of office, commercial, public administration, and residential uses. Figure IV.A-1 shows the Lake Merritt and Lake Merritt Channel improvements and surrounding land uses.

Lake Merritt Channel is a closed waterway between the Oakland Estuary to the south and Lake Merritt to the north. Four streets (12th, 10th, 7th and Embarcadero) cross the Channel on bridges or over culverts. A flood station at 7th Street regulates the water level in Lake Merritt. Pedestrian walkways parallel both sides of the Channel. The Channel is surrounded by primarily institutional, recreational, and transportation uses. Laney College occupies property on both sides of the Channel between 7th and 10th Streets. Interstate 880 (I-880), the Union Pacific Railroad tracks and an East Bay Municipal Utility District (EBMUD) pipeline cross the southern end of the Channel. Land uses in this area have been historically industrial, but several residential developments recently have been built or are planned. Estuary Park is located at the mouth of the Channel where it meets the Oakland Inner Harbor Channel and Oakland Estuary.

b. Waterfront Trail (Group 2). There are several properties along the Oakland waterfront that are proposed as part of the Measure DD Implementation Project that would complete the Oakland portion of the San Francisco Bay Trail. To facilitate the land use discussion of the Waterfront Trail group, the land uses associated with Group 2 are divided into four subgroups located geographically

in a north to south direction: Estuary Park; 10th Avenue Marina to Union Point Park; Park Street Bridge to Gallagher & Burk/Hanson Aggregate Trail Connection; and the 66th Avenue Gateway. Figures IV.A-2a and IV.A-2b show the proposed Waterfront Trail improvements and surrounding land uses.

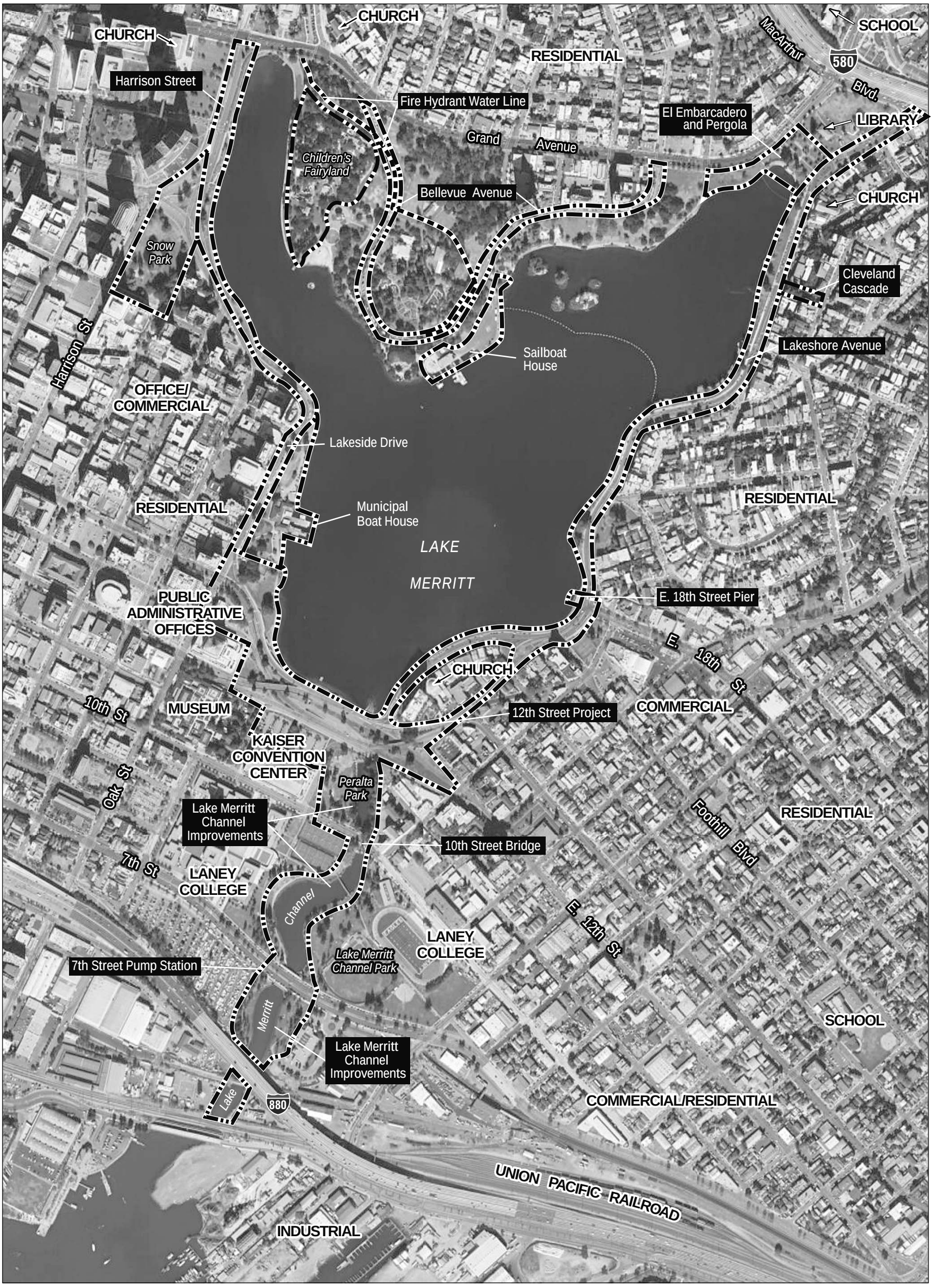
(1) Estuary Park. Estuary Park is part of the Oakland Parks and Recreation system. Facilities at the site include a sports field, boat ramp, parking area and associated hardscaping. The existing Waterfront Trail continues north to Alice Street from the site, eventually connecting to Jack London Square. Surrounding land uses include a residential development to the west and a commercial building, which may be incorporated into the park in the future, and the Jack London Aquatic Center to the north. The Jack London Aquatic Center is managed by a nonprofit corporation under an agreement with the City of Oakland. East Embarcadero, the Union Pacific Railroad tracks and additional commercial development are located further north. The outlet of the Lake Merritt Channel forms the eastern boundary of the park and the Oakland Harbor Channel is located to the south.

(2) 10th Avenue Marina to Union Point Park. This group of Waterfront Trail improvements begins at 10th Avenue on the northeast end of the 9th Avenue Terminal property and generally follows the shoreline and East Embarcadero until it reaches Union Point Park. Portions of the trail in this area have been developed previously. The Measure DD Implementation Project includes proposed improvements to the existing segments of trail, construction of new trail at Brooklyn Basin and other locations, remediation and renovation of the Cryer Site, and improvements at Union Point Park.

The existing segments of the Waterfront Trail in this area cross properties occupied by motels and other commercial uses, a marina, and industrial and light industrial uses. Land uses on the parcels where a new trail segment would be constructed include a restaurant, a marina, a pier, other commercial businesses, and vacant and/or unused industrial properties at Brooklyn Basin and the Cryer Site. The Union Pacific Railroad tracks and I-880 are located to the north and northeast and the Oakland Estuary is located to the south. Coast Guard Island and the City of Alameda are across the estuary to the south and west of the site.

A segment of the Waterfront Trail between Estuary Park and the 10th Avenue Marina would be developed by others as part of the Oak to Ninth Project. The proposed Oak to Ninth Project would redevelop an underused, maritime and industrial area between the Lake Merritt Channel and 10th Avenue into a mixed-use neighborhood with residential, retail/commercial, open space, and marina uses.

(3) Park Street Bridge to Gallagher & Burk/Hanson Aggregate Trail Connection. This group of proposed waterfront improvements is located along the Oakland Inner Harbor Tidal Canal between the Park Street Bridge and the Gallagher & Burk and Hanson Aggregate properties south of the High Street Bridge. Portions of the trail in this area have been developed previously. South of the Hanson Aggregate property the trail would connect to an existing trail segment that continues south to 66th Avenue. The Measure DD Implementation Project includes the proposed completion of trail gaps at the Oakland Museum Women's Board Building (between Derby Avenue and Lancaster Street), along Alameda Avenue, on the Gallagher & Burk and Hanson Aggregate properties, and at several bridge crossings. Pocket parks would be constructed at the end of Derby Avenue and Lancaster Street.



LSA

FIGURE IV.A-1

Oakland Measure DD
Existing Land Uses

PROJECT SITE
FIRE HYDRANT PROJECT

N

0 500 1000
FEET

SOURCE: GOOGLE EARTH, 2006; LSA ASSOCIATES, INC., 2007

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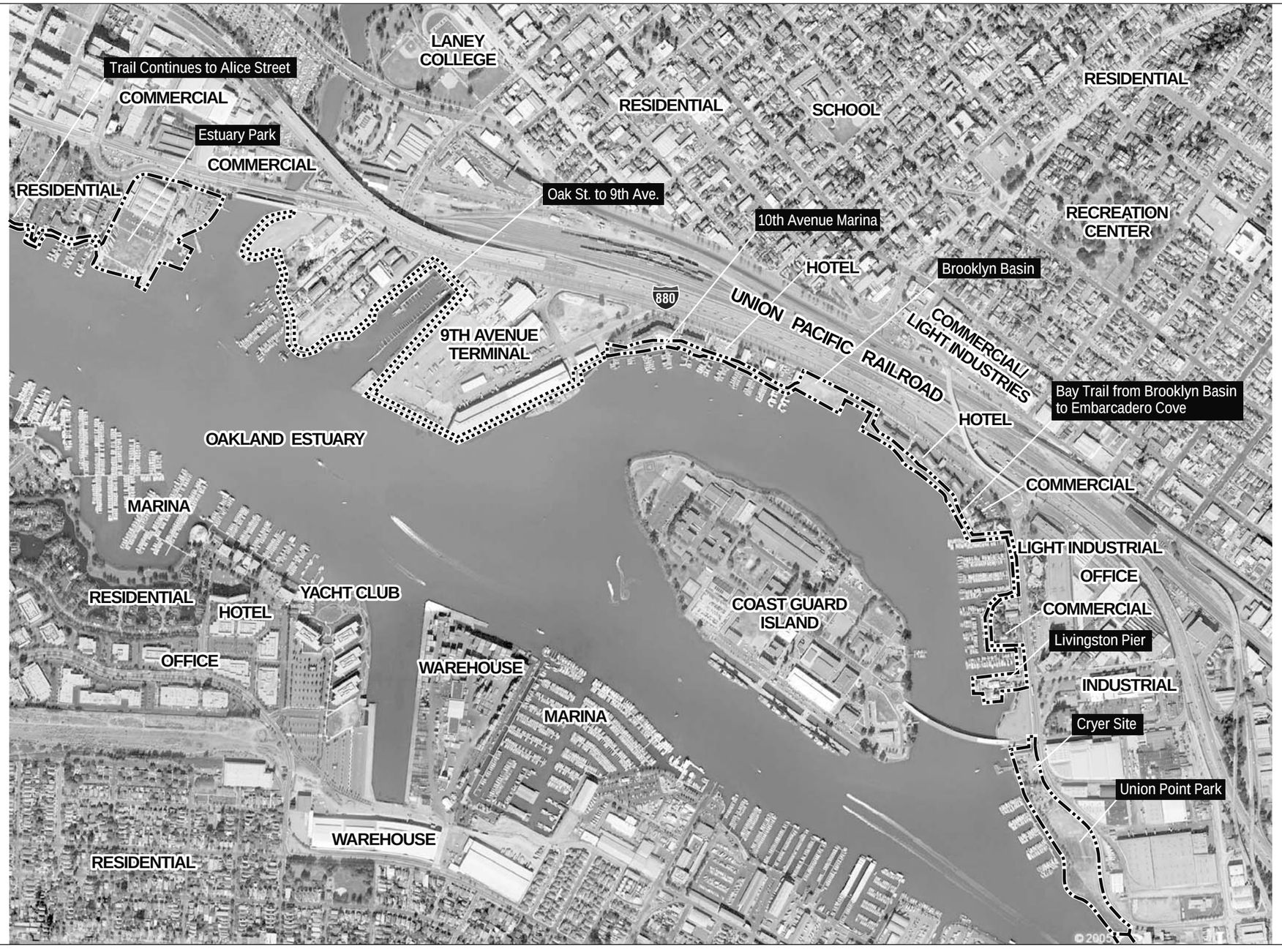

LSA

FIGURE IV.A-2a

N

0 500 1000
FEET

LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

Oakland Measure DD
Waterfront North
Existing Land Uses

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
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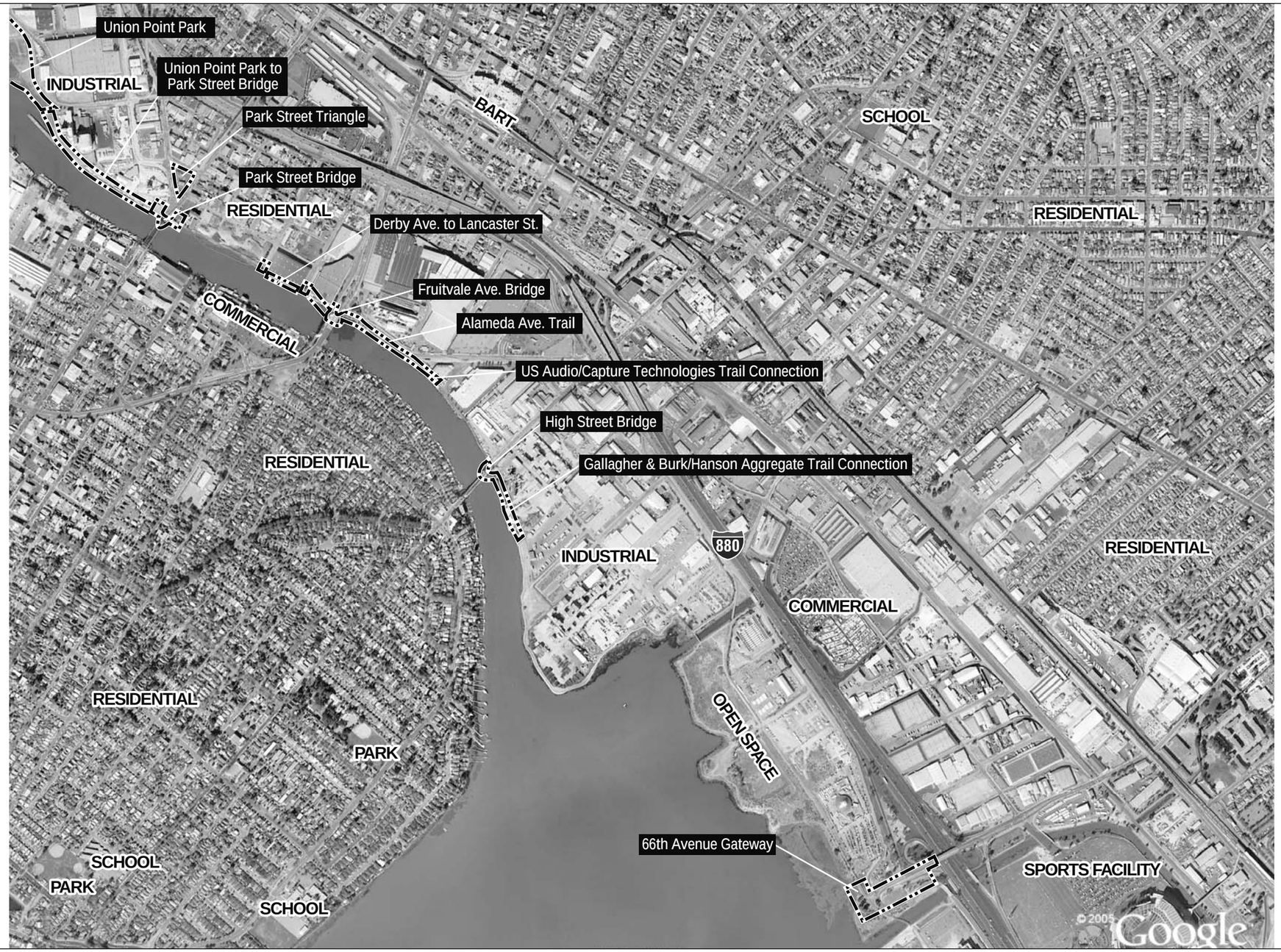

LSA

FIGURE IV.A-2b

N

0 500 1000
FEET

PROJECT AREA FOR WATERFRONT TRAIL GROUP

Oakland Measure DD
Waterfront South
Existing Land Uses

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
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Existing segments of the Waterfront Trail in this area cross properties occupied by residential, commercial, and recreational uses (University of California Rowing Center). Nearby land uses include residential, industrial and commercial facilities, waterways, roadways, and four bridges (three vehicle and one railroad) that cross the Tidal Canal. The Tidal Canal borders the study area to the south and west with the City of Alameda located on the opposing bank of the canal.

(4) 66th Avenue Gateway. The 66th Avenue Gateway site is an existing park occupied by open space, the Waterfront Trail, a parking area and roadway. Proposed project improvements include installation of a boardwalk and overlook, landscaping, signage, public sculpture, and an upgrade and expansion of the existing parking area. Martin Luther King, Jr. Regional Park, Arrow-head Marsh and San Leandro Bay are located to the west with Bay Farm Island located on the opposite shore of the bay. Open space and a commercial area that hosts temporary outdoor events are located to the north. Interstate 880, Network Associates Coliseum, Oracle Arena, and commercial and residential uses are located to the east. Damon Slough is immediately south of the 66th Avenue Gateway site. Oakland International Airport and other commercial or industrial uses located are located further to the south.

c. Recreational Facilities (Group 3). Land uses on and around Studio One and the East Oakland Sports Complex are described below. Figures IV.A-3 and IV.A-4 show the facilities and surrounding land uses.

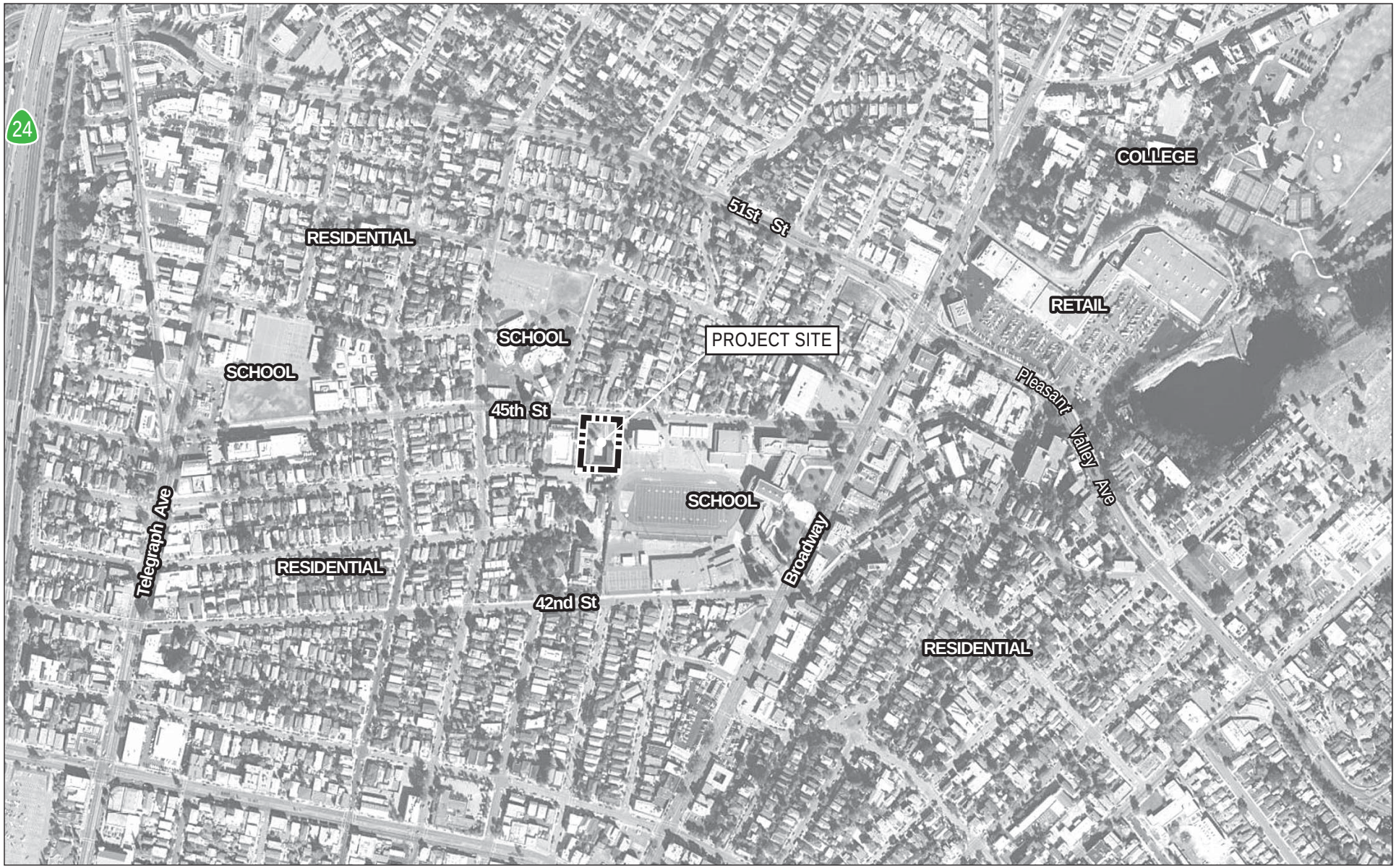
Studio One is a studio arts facility used for educational purposes. The primary land use near the site is residential. Land uses immediately surrounding the site include a high school (Oakland Technical High School) to the east, residential uses to the north and south, and recreational facilities (Temescal Pool) to the west. Highway 24 is located to the west and a shopping center and the California College of Arts are located northwest of the site.

The East Oakland Sports Complex would be constructed in Ira Jinkins Park/Recreation Center at the southeast corner of Edes Avenue and Jones Street and would provide a variety of recreational facilities including swimming pools, indoor courts, exercise rooms, and a baseball field. Land uses within the immediate vicinity of the sports complex include a Fed Ex and UPS shipping facility to the north, residential uses to the east, a school to the south, and residential uses to the west. I-880 is located to the southwest of the site. Office, residential, and retail uses are located further west of the site on the west side of I-880.

d. City-wide Creeks (Group 4). Creek restoration and acquisition sites are located throughout the City of Oakland. As such, land uses surrounding these sites vary. The creek restoration sites are mainly located within identified park and open space areas. The sites for acquisition would be located throughout the city within residential and commercial areas but are not specifically identified at this time.

e. Major Land Use Changes Around Measure DD Implementation Project Components. A number of projects are planned throughout the City that would result in land use changes. Major projects that have submitted an application or have been approved include:

- *Oak Street to Ninth Avenue Project*. This project is located along the Waterfront Trail between Estuary Park/Lake Merritt Channel and the 10th Avenue Marina site. Existing land uses on the site.



LSA

FIGURE IV.A-3

N

0 300 600

FEET

LEGEND

STUDIO ONE PROJECT SITE

Oakland Measure DD
Studio One
Existing Land Uses

SOURCE: GOOGLE EARTH, 2006

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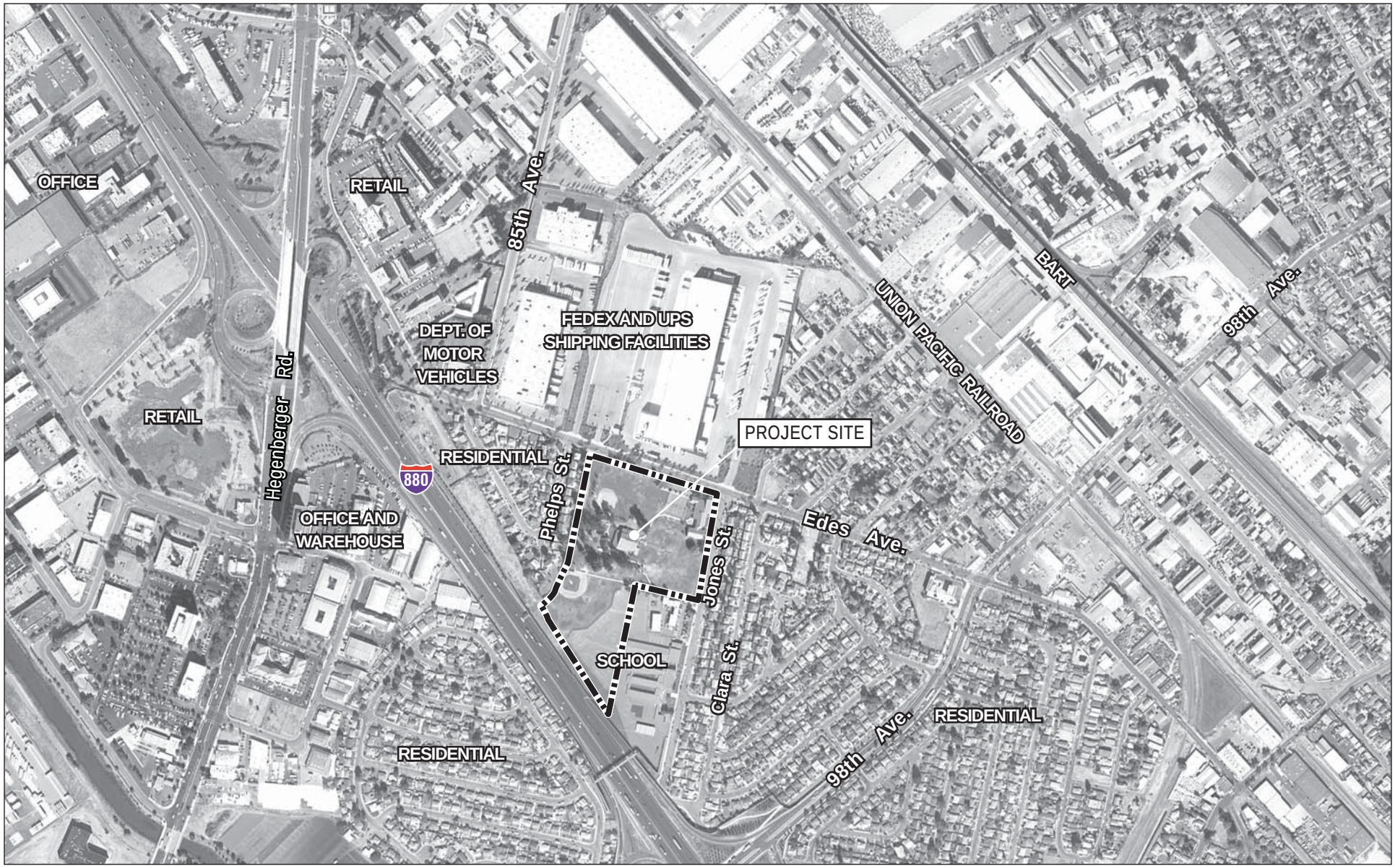

LSA

FIGURE IV.A-4

N

0 400 800
FEET

LEGEND

EAST OAKLAND SPORTS COMPLEX PROJECT SITE

Oakland Measure DD
East Oakland Sports Complex
Existing Land Uses

SOURCE: GOOGLE EARTH, 2006

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include industrial uses, boat marina facilities, and a wharf. Oakland Harbor Partners LLC has obtained certain approvals from the City of Oakland and the Oakland Redevelopment Agency to redevelop the 64-acre site with 3,100 residential dwelling units, 200,000 square feet of ground floor retail/commercial space, and approximately 28 acres of parks. As part of the project, changes were proposed to Estuary Park including re-vegetation of the 3.5-acre lawn/play field, shoreline protection, and improvements to the Bay Trail. Environmental impacts related to this project were evaluated in Oak to Ninth Avenue project Environmental Impact Report, August, 2005.

- *Jack London Square Redevelopment*. The Jack London Square Redevelopment area is located between The Embarcadero, Harrison Street, Alice Street, and 2nd Street, and was approved by the City Council in April 2004. The proposed redevelopment would include approximately 1.2 million square feet of mixed-use, retail, commercial and office space; a 1,700 seat movie theater; and a 250 room hotel.
- *Cathedral of Christ the Light*. This project would construct a 255,000 square foot cathedral at the intersection of Harrison Street and Grand Avenue.
- *1443 Alice Street*. The 1443 Alice Street project is a 241-unit residential (condominium) development. The project includes preservation of the existing 5-story Alice Street parking garage (with two subsurface parking levels); expansion of the parking garage to Harrison Street; approximately 30,000 square feet (floors six and seven) of general personal service use; and construction of 241 residential units in a 28-story tower above the parking garage and general personal services use.
- *226 13th Street*. The 226 13th Street is a residential/commercial development that would be located in Downtown Oakland. It would include 356 residential units and over 36,000 square feet of retail space.
- *377 2nd Street*. The 377 2nd Street project would include 96 residential units and approximately 4,000 square feet of retail space.
- *100 Grand Avenue*. The 100 Grand Avenue project is a 241-unit residential development that would be located in Downtown Oakland.

2. Impacts and Mitigation Measures

This section analyzes environmental impacts related to land uses that could result from implementation of the project components. The section begins with criteria of significance, which establish the thresholds for determining whether an impact is significant. The latter part of this section presents the impacts associated with the proposed project and identifies mitigation measures, as appropriate.

a. Criteria of Significance. Implementation of the project components would have a significant land use impact if they would:

1) Physically divide an established community;

2) Result in a fundamental conflict between adjacent or nearby land uses;

3) Fundamentally conflict with any applicable land use plan, policy, or regulation of agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local

coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment; or

4) Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan.

The level of impact to land use is discussed in the following section and summarized in Table IV.A-1.

Table IV.A-1: Summary of Potential Impacts - Land Use

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Physically divide an established community?	==	==	==	==
2) Result in a fundamental conflict between adjacent or nearby land uses?	○	◎ LAND-1	==	○
3) Fundamentally conflict with any applicable land use plan, policy, or regulation of agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment?	Conformance with land use policies is described in Section IV.B of the Draft EIR.			
4) Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan	==	==	==	==

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
○ Less-than-Significant or Less-than-Significant with standard Conditions of Approval
◎ Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable

LAND-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

b. Impacts and Mitigation Measures Applicable to all Project Components. Most of the potential land use impacts that would result from implementation of Measure DD would be essentially the same for each of the four project groups, as described below.

(1) Divide an Established Community. The physical division of an established community typically refers to the construction of a physical feature (such as an interstate highway or railroad tracks) or removal of a means of access (such as a local road or bridge) that would impair mobility within an existing community, or between a community and outlying area. For instance, the construction of an interstate highway through an existing community may constrain travel from one side of the community to another; similarly, such construction may also impair travel to areas outside the community. None of the proposed project components would divide an established community.

Lake Merritt and Lake Merritt Channel (Group 1). The proposed Measure DD components near Lake Merritt and the Lake Merritt Channel consist of improvements to recreational facilities, landscaping, and water quality, and replacement or realignment of streets and bridges. None of the recreational facilities, water quality, or landscaping improvements would physically divide a community, either temporarily during construction or on a permanent basis. Construction along 12th Street would be staged to provide pedestrian and traffic connections between the east and west sides of Lake Merritt during construction. Any bridge or street closures would be temporary and alternate routes would be provided for traffic and pedestrians. Several roadway improvements are proposed along Lakeshore Drive, Lakeside Avenue, Bellevue Avenue and at the Lakeside-Harrison-20th Street intersection. While there may be temporary closures associated with construction along these streets, none of the improvements would permanently divide a neighborhood, and all roadway improvements would include a means of rerouting traffic and facilitating pedestrian access across the roadways during construction.

Waterfront Trail (Group 2). The proposed Waterfront Trail components would be constructed along the waterfront, would improve waterfront access and use, and would not divide an established community.

Recreational Facilities (Group 3). Studio One would be renovated at its current location and the East Oakland Sports Complex would be constructed within an existing park. Neither would divide an established community.

City-wide Creeks (Group 4). The proposed City-wide Creeks components would restore, preserve and acquire areas adjacent to creeks for the purpose of improving water quality, hydrology and wildlife habitat and to prevent floods, improve public accessibility and increase community stewardship. Specific creek restoration activities may include creek bank stabilization, riparian habitat restoration, hydrology restoration, public education displays, erosion control, and introduction of native wildlife. None of the proposed components within this group would divide an established community.

(2) Create a Land Use Conflict. The potential impacts associated with land use conflicts are somewhat unique to each group and are discussed below in Section IV.A-2c.

(3) Conflict with Land Use Policy. Potential land use policy conflict is described in detail in Section IV.B, Planning Policy. Conflicts between a project and applicable policies do not constitute significant physical environmental impacts in and of themselves. A policy inconsistency is considered to be a significant adverse environmental impact only when it is related to a policy adopted for the purpose of avoiding or mitigating an environmental effect and it is anticipated that the inconsistency would result in a significant adverse physical impact based on the established significance criteria.

(4) Conflict with a Habitat Conservation Plan. The areas covered by the Measure DD Implementation Project are not currently subject to any adopted habitat conservation plans or natural community conservation plans.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential land use impacts that are unique to individual project components.

(1) Divide an Established Community. There are no component-specific impacts associated with this criterion. Potential impacts associated with this criterion are discussed above in Section IV.A-2b(1).

(2) Create a Land Use Conflict. The potential land use conflicts associated with each group are discussed below.

Lake Merritt and Lake Merritt Channel (Group 1). The proposed components of Measure DD implementation situated around Lake Merritt and along Lake Merritt Channel consist of recreational facility improvements, channel improvements, bridge replacements, water quality and landscaping improvements, and roadway improvements. No new land uses that do not already existing in the immediate project area would be introduced to Lake Merritt or the Channel, and no land use incompatibility is expected to result from the Lake Merritt or Lake Merritt Channel improvements.

Waterfront Trail (Group 2). The Estuary Policy Plan envisions recreational, commercial and industrial uses along the Waterfront Trail area. The proposed Waterfront Trail components would upgrade existing trails, install new trail segments and parks, and clean-up contaminated properties. Most Waterfront Trail components would not create a potential land use conflict. However, installation of the Waterfront Trail along the Hanson Aggregate Trail Connection could result in a significant land use conflict because it would create a site-specific safety hazard.

Impact LAND-1 (Group 2): Installation of the Hanson Aggregate Trail Connection could result in a land use compatibility conflict. (S)

The proposed segment of the Waterfront Trail that would cross the Hanson Aggregate property would pass beneath a conveyor belt used to offload gravel and sand from barges in the Tidal Canal approximately four times a week. This is identified as a potential land use conflict as two non-complementary land uses would be occupying the same site. During operation of the conveyor belt, materials could fall from the conveyor belt and strike trail users. Safety measures would be required to ensure that materials do not strike trail users as they pass beneath the conveyor belt while it is in operation.

> **Mitigation Measure LAND-1:** A steel canopy shall be designed by a registered professional engineer, the design shall be reviewed by a safety professional, and the canopy shall be installed by the City under the conveyor belt to protect pedestrians using the trail. The canopy shall be installed prior to the opening of this segment of the Waterfront Trail. Implementation of this mitigation measure would reduce Impact LAND-1 to a less-than-significant level. However, this measure is dependent upon the City successfully entering into an agreement with the property owner to construct the steel canopy. Because the mitigation measure is needed to prevent a safety hazard as well as a land use conflict, the City shall not construct the trail across the property without including the protective canopy in the project design while the conveyor is in operation on the site. Should the property owner decline to allow the City to construct the canopy, the City shall not construct the trail on the property and instead reroute it onto City streets until such time as the use of the conveyor ceases or the property owner agrees to allow the City to construct the canopy. (LTS)

Recreational Facilities (Group 3). Studio One and the East Oakland Sports Complex would be located on sites that are currently used for the same or similar recreational activities and the proposed components would have no impact on land use in these areas.

City-wide Creeks (Group 4). The City-wide Creeks group would restore, preserve and acquire areas adjacent to creeks for the purpose of improving water quality, hydrology and wildlife habitat and to prevent floods, improve public accessibility and increase community stewardship. Specific activities may include creek bank stabilization, riparian habitat restoration, hydrology restoration, public education displays, erosion control, and introduction of native wildlife. Because the proposed work would occur adjacent to existing creeks in parks or residential areas and would not change the fundamental land use of the site, none of these activities would create a land use conflict.

B. PLANNING POLICY

This section evaluates the consistency of the proposed project with applicable land use planning and regulatory documents. Documents reviewed include several elements from the City of Oakland's General Plan: Land Use and Transportation Element; the Estuary Policy Plan; and the Open Space, Conservation, and Recreation Element; the Historic Preservation Element; the Bicycle Master Plan; and the Pedestrian Master Plan. In addition, the City of Oakland Lake Merritt Park Master Plan, City of Oakland Planning Code, the Bay Trail Plan (prepared by the Associated of Bay Area Governments), and the San Francisco Bay Plan (prepared by the San Francisco Bay Conservation and Development Commission) are discussed. A table summarizing the project's consistency with Oakland documents is presented in Appendix D.

Policy conflicts in and of themselves, and in the absence of adverse physical impacts, are not considered to have significant effects on the environment and are differentiated from impacts identified in the other topical sections of this chapter. Physical impacts associated with policy conflicts are addressed in the appropriate technical sections of Chapter IV (e.g., noise, traffic). Other local, regional or State plans and policies, such as those relating to air quality or water quality, are discussed in those sections of this EIR.

1. Applicable Regulatory Documents

The following section summarizes the relevant plans, policies and regulations adopted by the City of Oakland (or other relevant agencies) that are applicable to the proposed project.

a. City of Oakland General Plan

The City of Oakland General Plan (General Plan) is a comprehensive plan for the growth and development of the City. The General Plan includes policies related to: land use and transportation; open space, conservation and recreation; housing; historic resources; noise; bikes and pedestrians; and the estuary. These topics are addressed within individual elements of the General Plan.

(1) Land Use and Transportation Element. The Land Use and Transportation Element[1] (LUTE) was adopted in March 1998 and addresses land use and transportation issues. In order to accomplish a more integrated planning process that incorporates City-wide infrastructural needs with demands for neighborhood decision-making, the LUTE includes general development policies for the City, in addition to district-specific policies. The LUTE is bound by a vision for the City that includes creating: "clean and attractive neighborhoods rich in character and diversity, each with its own distinctive identity, yet well-integrated into a cohesive urban fabric" in addition to "a diverse and vibrant downtown with around-the-clock activity."

In addition to city-wide directives, the LUTE provides for issues and policies that are specific to areas within the City. The Waterfront area is included as one of these specific areas. General Waterfront goals include the following:

- Increase the awareness of the waterfront throughout the City and the region, and maximize the benefit of Oakland's waterfront for the people of Oakland.

[1] City of Oakland Community and Economic Development Agency, 1998. *Land Use and Transportation Element,* March.

- Promote the diversity of the waterfront by providing opportunities for new parks, recreation, and open space; cultural, educational, and entertainment experiences; and new or revitalized retail, commercial, and residential development.
- Enhance and promote the City's waterfront for the economic benefit of the community with emphasis on Oakland's position as a leading west coast maritime terminal and a primary Bay Area passenger and cargo airport.
- Connect the waterfront to the rest of the City with emphasis on linking adjacent neighborhoods and Downtown directly to the waterfront, reducing physical barriers and the perception of isolation from the water's edge, and improving public access to and along the waterfront.
- Preserve and enhance the existing natural areas along the waterfront.

The LUTE includes land use designations for all land within the City's boundaries. The General Plan Land Use map (Figures IV.B-1, IV.B-2, IV.B-3, and IV.B-4) shows the land use designations of the Measure DD component sites. These designations are briefly described in Table IV.B-1. An analysis of LUTE policies that are applicable to the project is provided in a table located in Appendix D.

Table IV.B-1: General Plan Land Use Designations

Land Use Classification	Intent of Classification
Lake Merritt and Lake Merritt Channel	
Central Business District	The Central Business District classification is intended to encourage, support, and enhance the downtown area as a high density mixed use urban center of regional importance and a primary hub for business, communications, office, government, high technology, retail, entertainment, and transportation in Northern California.
Neighborhood Center	The Neighborhood Center Mixed use classification is intended to identify, create, maintain and enhance mixed use neighborhood commercial centers. These centers are typically characterized by smaller scale pedestrian-oriented, continuous street frontage with a mix of retail, housing, office, active open space, eating and drinking places, personal and business services, and smaller scale educational, cultural, or entertainment uses.
Urban Open Space	The Urban Park and Open Space classification is intended to identify, enhance and maintain land for parks and open space. Its purpose is to maintain an urban park, schoolyard, and garden system which provides open space for outdoor recreation, psychological and physical well-being, and relief from the urban environment.
Urban Residential	This classification is intended to create, maintain, and enhance areas of the City that are appropriate for multi-unit, mid-rise or high-rise residential structures in locations with good access to transportation and other services.
Waterfront Trail *(included in the Estuary Policy Plan Element of the General Plan)*	
General Commercial #1	Provide for the expansion of regional-serving retail and commercial uses that can benefit from freeway accessibility.
Heavy Industry	Retain the existing glass recycling and manufacturing functions within this area, and promote an enhanced relationship with the adjoining Kennedy Tract neighborhood, Fruitvale Avenue, and the waterfront.
Parks	No intent included in Estuary Policy Plan.
Planned Waterfront Development #1	Provide for the transformation of maritime and marine industrial uses into a public-oriented waterfront district that encourages significant public access and open space opportunities. Encourage a unique mix of light industrial, manufacturing, artist lofts and workshops, hotel, commercial-recreation, cultural uses, and water-oriented uses that complement recreational and open space character of the waterfront.
Planned Waterfront Development #3	Provide for the continuation of existing industrial uses on properties south of Tidewater Avenue, allowing for their transition to light industrial, research and development, and office uses in a waterfront business park setting.
Residential Mixed Use	Enhance and strengthen the viability and attractiveness of the Kennedy Tract as a mixed-use residential neighborhood of low to medium-density housing within a fine-grained fabric of commercial and light industrial.
Waterfront Commercial Recreation #2	Encourage a mix of hotel, commercial-recreational and water oriented uses that complement the recreational and open space character of the waterfront, enhance public access, and take advantage of highway visibility.

Table IV.B-1 *Continued*

Land Use Classification	Intent of Classification
Recreational Facilities	
Institutional	The Institutional classification is intended to create, maintain, and enhance areas appropriate for educational facilities, cultural and institutional uses, health services and medical uses as well as other uses of similar character.
Urban Open Space	See above.
City-wide Creeks[a,b]	
Urban Open Space	See above.
Hillside Residential	The Hillside Residential classification is intended to create, maintain, and enhance neighborhood residential areas that are characterized by detached, single unit structures on hillside lots. Typical lot sizes range from approximately 8,000 square feet to one acre in size.
Mixed-Housing Type	The Mixed Housing Type Residential classification is intended to create, maintain, and enhance residential areas typically located near the City's major arterials and characterized by a mix of single family homes, townhouses, small multi-unit buildings, and neighborhood businesses where appropriate.
Resource Conservation	The Resource Conservation classification is intended to identify, enhance and maintain publicly-owned lands for the purpose of conserving and appropriately managing undeveloped areas which have high natural resource values, scenic value, or natural hazards which preclude safe development.

[a] It is assumed that all restoration project components would occur within city parks that would have an Urban Open Space Land Use Classification.

[b] As exact locations of acquisition/restoration/preservation activities may change, the Land Use Classifications listed in the table may not include all General Plan classifications of City-wide Creek sites.

Source: City of Oakland Land Use and Transportation Element, 1998.

(2) Estuary Policy Plan. The Estuary Policy Plan[2] (Estuary Plan) includes objectives and policies aimed at enhancing the area of Oakland between Adeline Street, the Nimitz Freeway, 66th Avenue, and the Estuary shoreline. The Estuary Plan is considered an element of the Oakland General Plan.

The Estuary Plan outlines a system of open spaces and shoreline access for recreational use, environmental enhancements, interpretive experiences, visual amenities, and significant gathering places. The Estuary Plan presents recommendations related to land use, development, urban design, shoreline access, public spaces, regional circulation, and local street improvements for the entire waterfront and individual districts within it.

The goals of the Estuary Plan include the following:

- Increase the awareness of the waterfront throughout the city and region, and maximize the benefits of Oakland's waterfront for the people of the city.
- Promote the diversity of the waterfront by providing opportunities for new parks, recreation, and open space; cultural, educational and entertainment experiences; and new or revitalized retail, commercial and residential development
- Enhance and promote the city's waterfront for the economic benefit of the community, with emphasis on Oakland's position as a leading West Coast maritime terminal and a primary Bay Area passenger and cargo airport.
- Connect the waterfront to the rest of the city, with emphasis on linking the adjacent neighborhoods and downtown directly to the waterfront, reducing physical barriers and the perception of isolation from the water's edge, and improving public access to and along the waterfront.
- Preserve and enhance the existing natural areas along the waterfront.

[2] City of Oakland and Port of Oakland, 1999. *Estuary Policy Plan,* as amended June 20, 2006.

The Estuary Plan includes land use designations for all land within the Oakland Estuary. The General Plan Land Use map identifies the project site as within the Estuary Policy Plan Area. Estuary Plan land use classifications within the project area are outlined in Table IV.B-1 and shown in Figure IV.B-2. An analysis of key Estuary Plan objectives and policies that are applicable to the project site is provided in a table located in Appendix D.

(3) Open Space, Conservation and Recreation Element. The Open Space, Conservation, and Recreation Element[3] (OSCAR) is the official policy document addressing the management of open land, natural resources and parks in Oakland, and is part of the Oakland General Plan. This element is divided into four major chapters that discuss Open Space, Conservation, Recreation, and Area Plans. The Open Space, Conservation, and Recreation chapters are relevant for the Measure DD Implementation Project, and a table located in Appendix D outlines the project's relationship to relevant objectives and policies. These relevant chapters are briefly described below.

Open Space. Of the 10,000 acres within the City of Oakland, approximately 28 percent consists of open space. Open space areas include wetlands along the Bay and Estuary, the holdings of large institutions like the University of California, and functional uses like the Mandela Parkway medians. The majority of open space within the City is along the waterfront and in the Oakland Hills. Many of the Measure DD components are part of the open space within the City.

The following Open Space goals are outlined in the OSCAR Element:

- Goal OS-1: A citywide open space system accessible to every Oakland resident which provides land for recreation, natural resources management, the protection of public health and safety, and visual enjoyment (see Figure 3: Open Space Plan within OSCAR).
- Goal OS-2: An attractive, accessible shoreline and creek system which complements the City's parks and open spaces.
- Goal OS-3: A beautiful city with open spaces, parks and streets that create a positive, well-defined civic image.

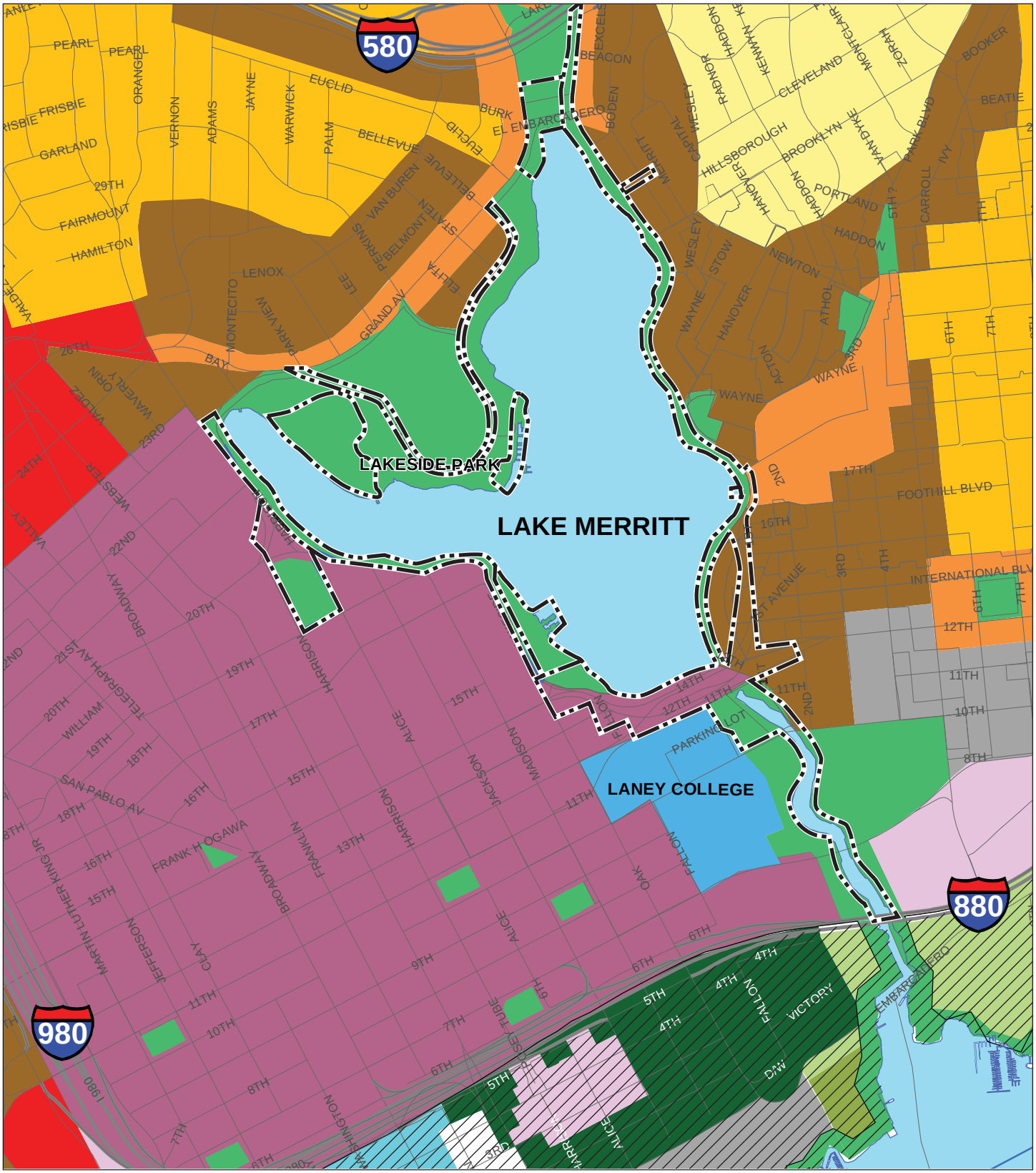
Conservation. This section of the OSCAR Element addresses the conservation, development, and utilization of Oakland's natural resources. The Conservation chapter is divided into five sections, each focusing on a different aspect of the City's natural resources. These sections include: earth resources (soil, land stability, and minerals); water resources (water supply, water quality, and surface waters); plant and animal resources (plant communities, wetlands, rare and endangered species, vegetation management, and wildlife); air resources; and energy resources.

The following Conservation goal applies to all sections within this chapter:

- Goal CO-1: Natural Resources that are conserved and prudently used to sustain life, support urban activities, protect public health and safety, and provide a source of beauty and enjoyment.

Recreation. The City of Oakland has over 2,900 acres of parkland. There are more than 130 parks and athletic field complexes in Oakland, ranging from undeveloped open space to intensely developed urban spaces. This chapter of the OSCAR Element describes: the existing types of parks within the City of Oakland, as well as park demand and needs; park operations; human resources and funding.

[33] City of Oakland, 1996. *Open Space, Conservation, and Recreation (OSCAR) Element*, June.



LSA

LEGEND

GENERAL PLAN
- DETACHED UNIT RESIDENTIAL
- MIXED HOUSING TYPE RESIDENTIAL
- URBAN RESIDENTIAL
- NEIGHBORHOOD CENTER MIXED USE
- COMMUNITY COMMERCIAL
- HOUSING & BUSINESS MIX

GENERAL PLAN–CONT.
- CENTRAL BUSINESS DISTRICT
- BUSINESS MIX
- INSTITUTIONAL
- URBAN OPEN SPACE

ESTUARY POLICY PLAN
- MIXED USE DISTRICT
- PARKS

ESTUARY POLICY PLAN–CONT.
- PLANNED WATERFRONT DEVELOPMENT #1
- RETAIL DINING ENTERTAINMENT #2
- WATERFRONT MIXED USE
- WATERFRONT WAREHOUSE DISTRICT
- PRODUCE MARKET
- PROJECT SITE

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FEET

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007.

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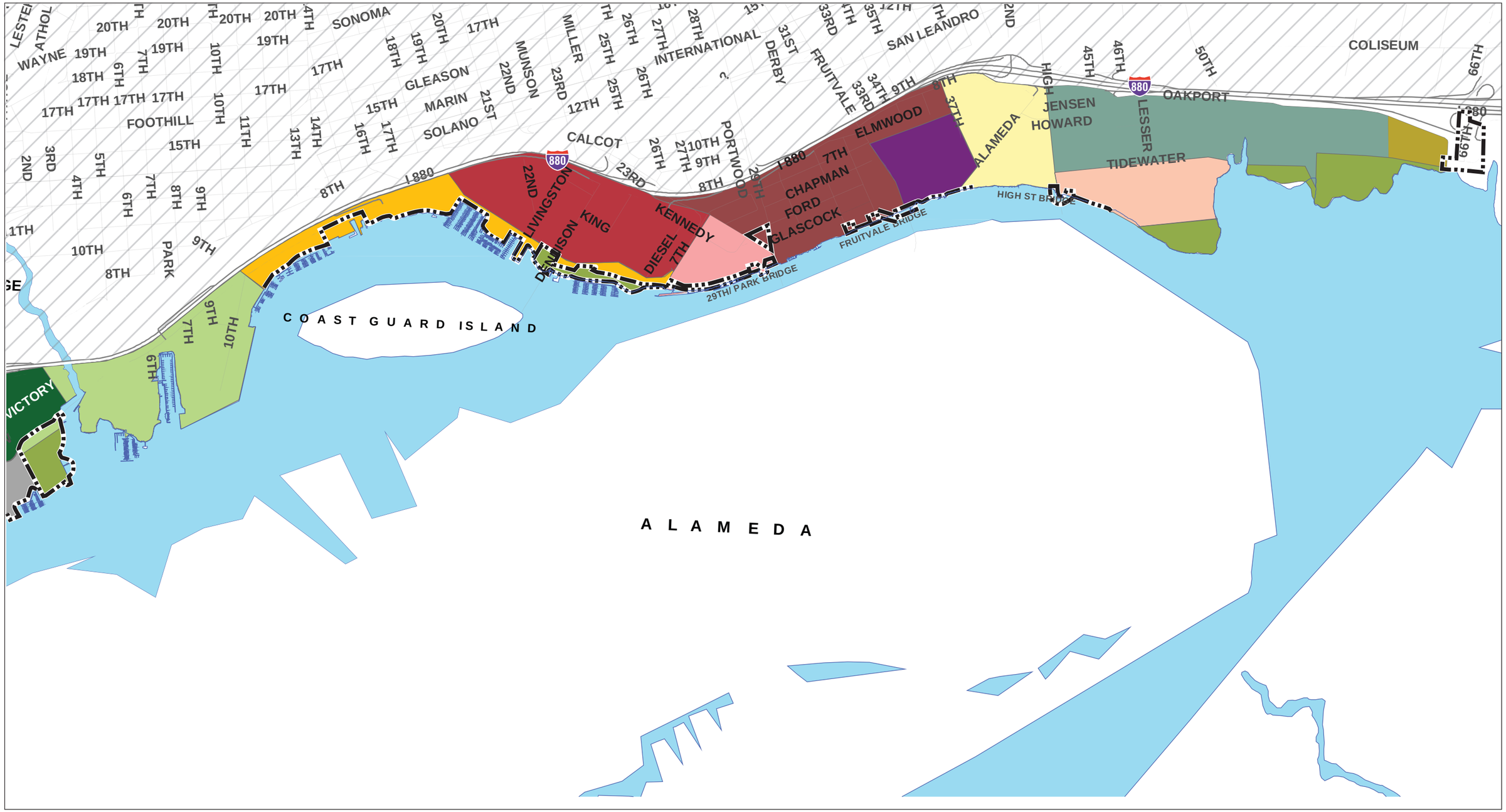
FIGURE IV.B-1

Oakland Measure DD
Lake Merritt and Lake Merritt Channel General Plan Land Use Designations



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ESTUARY PLAN LAND USE CLASSIFICATION

- MIXED USE DISTRICT
- WATERFRONT MIXED USE
- WATERFRONT COMMERCIAL RECREATION 2
- PARKS
- PLANNED WATERFRONT DEVELOPMENT 1
- PLANNED WATERFRONT DEVELOPMENT 2
- PLANNED WATERFRONT DEVELOPMENT 3
- HEAVY INDUSTRY
- LIGHT INDUSTRY 2
- LIGHT INDUSTRY 3
- GENERAL COMMERCIAL 1
- GENERAL COMMERCIAL 2
- PROJECT AREA FOR WATERFRONT TRAIL GROUP
- GENERAL PLAN AREA

FIGURE IV.B-2

Oakland Measure DD
Waterfront Trail Group
Estuary Plan Land Use Designations

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007
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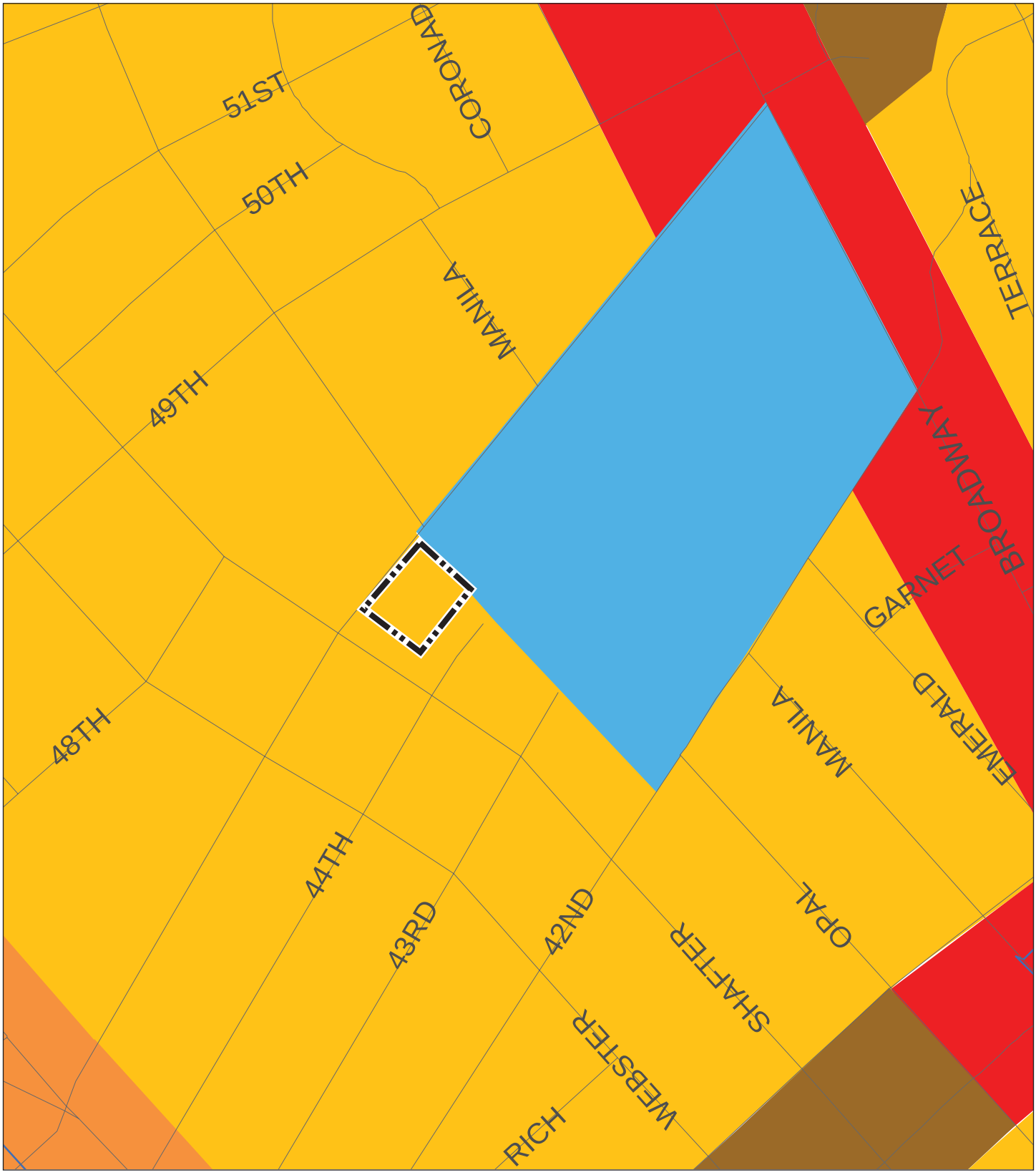

LSA

LEGEND

- MIXED HOUSING TYPE RESIDENTIAL
- COMMUNITY COMMERCIAL
- REGIONAL COMMERCIAL
- URBAN RESIDENTIAL
- INSTITUTIONAL
- PROJECT SITE

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FIGURE IV.B-3

Oakland Measure DD
Studio One
General Plan Land Use Designations

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007.

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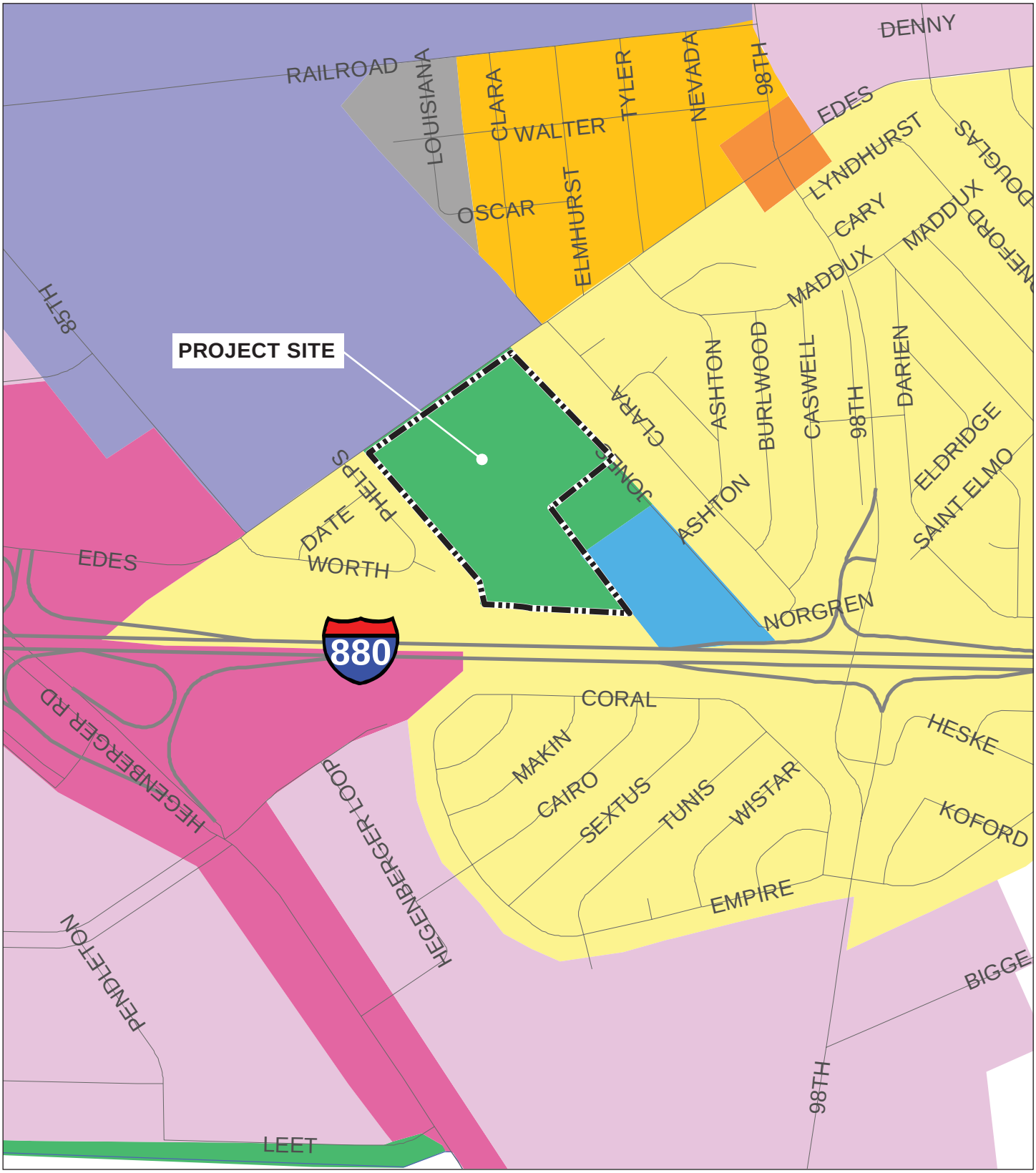

LSA

LEGEND

- DETACHED UNIT RESIDENTIAL
- MIXED HOUSING TYPE RESIDENTIAL
- GEN. INDUSTRIAL/TRANSPORTATION
- NEIGHBORHOOD CENTER MIXED USE
- REGIONAL COMMERCIAL
- HOUSING & BUSINESS MIX
- URBAN OPEN SPACE
- INSTITUTIONAL
- PROJECT SITE

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FEET

FIGURE IV.B-4

Oakland Measure DD
Sports Complex
General Plan Land Use Designations

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007.

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The following Recreation goals are outlined in the OSCAR Element:

- Goal REC-1: A park system which meets a diverse range of recreational needs without compromising the value of parks as open space.
- Goal REC-2: Safe, clean, accessible, efficiently-run parks that complement the quality of life in Oakland.
- Goal REC-3: Recreational services which fully utilize human resources and promote personal growth, celebrate Oakland's cultural diversity, and serve all communities equitably.

(4) Historic Preservation Element. The Historic Preservation Element[4] (HPE) is part of the City of Oakland General Plan and defines goals, objectives, policies and actions that encourage preservation and enhancement of Oakland's older buildings, districts and other physical environmental features having special historic, cultural, educational, architectural or aesthetic interest or value.

HPE policies define the criteria for legal significance that must be met by a resource before it is listed in Oakland's local register of historical resources. Based on a city-wide preliminary architectural inventory completed by the OCHS, pre-1945 properties have been assigned a significance rating of A, B, C, D, or E and assigned a number (1, 2, or 3) which indicates its district status. The ranking system indicates a property's status as a historical resource and identifies those properties warranting special consideration in the planning process.

The goals of the Historic Preservation Element include the following:

- GOAL 1: To use historic preservation to foster the economic vitality and quality of life in Oakland by:

  (1) Stressing the positive community attributes expressed by well-maintained older properties;

  (2) Maintaining and enhancing throughout the City the historic character, distinct charm, and special sense of place provided by older properties;

  (3) Establishing and retaining positive continuity with the past thereby promoting pride, a sense of stability and progress, and positive feelings for the future;

  (4) Stabilizing neighborhoods, enhancing property values, and conserving housing stock, increasing public and private economic and financial benefits, and promoting tourist trade and interest through preservation and quality maintenance of significant older properties;

  (5) Preserving and encouraging a city of varied architectural styles and environmental character reflecting the distinct phases of Oakland's cultural, social, ethnic, economic, political, and architectural history; and

  (6) Enriching the quality of human life in its educational, spiritual, social, and cultural dimensions through continued exposure to tangible reminders of the past.

- GOAL 2: To preserve, protect, enhance, perpetuate, use, and prevent the unnecessary destruction or impairment of properties or physical features of special character or special historic, cultural, educational, architectural or aesthetic interest or value.

  Such properties or physical features include buildings, building components, structures, objects, districts, sites, natural features related to human presence, and activities taking place on or within such properties or physical features.

(5) Bicycle Plan. The Bicycle Master Plan[5] is the official policy document addressing the development of facilities and programs to enhance the role of bicycling as a viable transportation

[4] City of Oakland, 1994. *City of Oakland Historic Preservation, an Element of the Oakland General Plan,* March 8.

[5] City of Oakland, 1999. *Bicycle Master Plan,* July.

choice in Oakland, and is part of the LUTE Element of the General Plan. The Bicycle Master Plan defines new City policies and recommends actions that would encourage and support bicycle travel improvements. An analysis of key Bicycle Master Plan policies that are applicable to the project site is provided in a table located in Appendix D.

The Bay Trail (from the Emeryville to San Leandro borders), the Lake Merritt Channel Pathway, and the Lake Merritt Pathway, are identified as a key bikeway corridors. Implementation of Measure DD would result in the installation or renovation of these bikeway corridors.

The goals of the Bicycle Master Plan include the following:

- Provide a policy framework and action program for enhancing the role of bicycling as a viable and appropriate transportation choice.
- Encourage and support bicycling to work, shopping, school and recreation by eliminating barriers and providing safe and convenient bicycle facilities.
- Maximize the number of bicycle commuters to help reduce traffic congestion and air pollution.
- Create a citywide network of bikeways connecting neighborhoods, activity centers and regional destinations.

(6) Pedestrian Master Plan. The Pedestrian Master Plan[6] is intended to promote pedestrian safety and access to ensure that Oakland is a safe, convenient, and attractive place to walk. It establishes a Pedestrian Route Network which includes streets, walkways, and trails that connect to schools, libraries, parks, neighborhoods, and commercial districts throughout the City. The Pedestrian Master Plan is a part of the LUTE Element of the General Plan. An analysis of key Pedestrian Master Plan policies that are applicable to the project site is provided in a table located in Appendix D.

The goals of the Pedestrian Master Plan include the following:

- Pedestrian Safety. Create a street environment that strives to ensure pedestrian safety.
- Pedestrian Access. Develop an environment throughout the City – prioritizing routes to school and transit – that enables pedestrians to travel safely and freely.
- Streetscaping and Land Use. Provide pedestrian amenities and promote land uses that enhance public spaces and neighborhood commercial districts.
- Education. Educate citizens, community groups, business associations, and developers on the safety, health, and civic benefits of walkable communities.
- Implementation. Integrate pedestrian considerations based on federal guidelines into projects, policies, and the City's planning process.

b. Lake Merritt Master Plan. The Lake Merritt Master Plan[7] (LMMP) was adopted in 2002 to serve as a guiding vision for the park area around Lake Merritt. The LMMP acts as a guide for future improvements to the park, sets goals and makes specific recommendations for various improvements. The LMMP describes the water resources associated with the Lake, access and circulation around the park, park landscaping, as well as the wildlife that is supported by the lake and the park. The LMMP also provides recommendations to preserve and maintain these resources. The forestry recommendations, for example, include reforesting high-use areas and providing for tree maintenance.

[6] City of Oakland, 2002. *Pedestrian Master Plan*, November 12.

[7] City of Oakland, 2002. *Lake Merritt Park Master Plan*, July.

c. City of Oakland Planning Code. The City of Oakland Planning Code (Planning Code) implements the policies of the General Plan and certain other of the City's plans, policies, and ordinances. The Planning Code divides the City into zones, each of which is assigned different regulations. These regulations direct the construction, nature, and extent of building use. Figures IV.B-5, IV.B-6a, IV.B-6b, IV.B-7, and IV.B-8 show the Planning Code zoning designations within and around the Measure DD Groups. Table IV.B-2 shows the Planning Codes designations and the intent of those designations.

d. Bay Trail Plan. The San Francisco Bay Trail Plan[8] proposes the development of a regional hiking and bicycling trail around the perimeter of the San Francisco and San Pablo Bays. The Bay Trail Plan was adopted by ABAG in 1989 and planned for approximately 400 miles of trails to form a "ring around the Bay." Implementation of roughly half of the total planned length of the Bay Trail has been coordinated by the Bay Trail Project, a non-profit organization. As of June 2006, another 100 miles of trails have been planned. The Waterfront Trail component of Measure DD would implement portions of the Bay Trail along the Oakland Estuary.

e. San Francisco Bay Plan. The San Francisco Bay Plan[9] (Bay Plan) is a policy tool that, under the provisions of the McAteer-Petris Act, allows the San Francisco Bay Conservation and Development Commission (BCDC) to "exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction," an area that includes all of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways associated with the Bay. The Bay Plan stipulates: "Any public agency or private owner holding shoreline land is required to obtain a permit from the Commission before proceeding with (shoreline) development." Implementation of the proposed project would require BCDC permit approval for development within the 100-foot shoreline band. Measure DD includes waterfront improvements within 100 feet of the shoreline.

2. Policy Consistency

As noted earlier, conflicts between a project and applicable policies do not constitute a significant physical environmental impact in and of themselves; as such, the project's consistency with applicable policies is discussed separately from the physical land use impacts associated with the project. A policy inconsistency is considered to be a significant adverse environmental impact only when it is related to a policy adopted for the purpose of avoiding or mitigating an environmental effect and it is anticipated that the inconsistency would result in a significant adverse *physical* impact based on the established significance criteria. The proposed project's consistency with regional policies related to physical environmental topics (e.g, air quality, transportation, and noise) is fully analyzed and discussed in those topical sections.

Conflicts with a General Plan do not inherently result in a significant effect on the environment within the context of CEQA. As stated in Section 15358(b) of the CEQA Guidelines, "[e]ffects analyzed under CEQA must be related to a physical change." Section 15125(d) of the Guidelines states that EIRs shall discuss any inconsistencies between the proposed project and applicable General Plans in the Setting section of the document (not under Impacts).

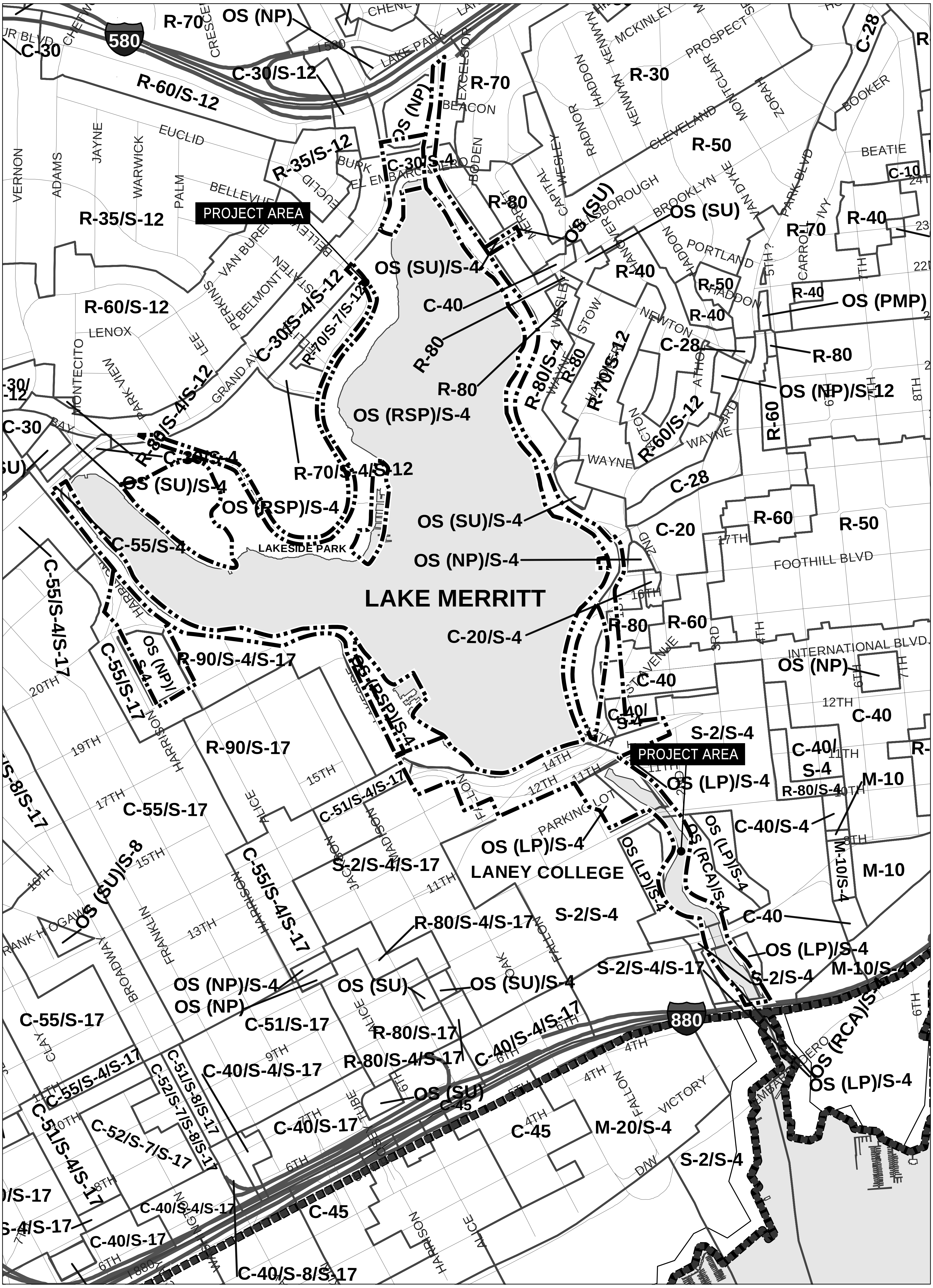
[8] Association of Bay Area Governments, 1989. *San Francisco Bay Trail Plan.* July.

[9] San Francisco Bay Conservation and Development Commission, 2006. *San Francisco Bay Plan*, January.

Further, Appendix G of the Guidelines (Environmental Checklist Form) makes explicit the focus on *environmental* policies and plans, asking if the project would "conflict with any applicable land use plan, policy, or regulation . . . *adopted for the purpose of avoiding or mitigating an environmental effect*" (emphasis added). Even a response in the affirmative, however, does not necessarily indicate the project would have a significant effect, unless a physical change would occur. To the extent that physical impacts may result from such conflicts, such physical impacts are analyzed elsewhere in this EIR.

The General Plan contains many policies, which may in some cases address different goals, and thus some policies may compete with each other. The Planning Commission/City Council, in deciding whether to approve the proposed project, must decide whether, on balance, the project is consistent (i.e., in general harmony) with the General Plan.

The Measure DD components, and their relationship to policies within the General Plan, are briefly described in a table located in Appendix D. Implementation of Measure DD would generally conform to the policies outlined in the General Plan elements, as the project improves existing recreation and open space areas, or creates new recreational opportunities for residents of Oakland. Please see Appendix D for more analysis of Measure DD's relationship to specific policies within the General Plan.



LSA

LEGEND

PROJECT AREA FOR LAKE MERRITT AND LAKE MERRITT CHANNEL GROUP

ESTUARY POLICY PLAN AREA

ZONING BOUNDARY

RESIDENTIAL ZONING
R-30 ONE-FAMILY
R-35 SPECIAL ONE-FAMILY
R-40 GARDEN APARTMENT
R-50 MEDIUM DENSITY
R-60 MEDIUM HIGH DENSITY
R-70 HIGH DENSITY
R-80 HIGH-RISE APT.
R-90 DOWNTOWN APT.

OPEN SPACE ZONING
OS (LP) LINEAR PARK
OS (NP) NEIGHBORHOOD PARK
OS (PMP) PASSIVE MINI-PARK
OS (RCA) RESOURCE CONSERVATION AREA
OS (RSP) REGION-SERVING PARK
OS (SU) SPECIAL USE

COMMERCIAL ZONING
C-10 LOCAL RETAIL
C-20 SHOPPING CENTER
C-28 COMMERCIAL SHOPPING DISTRICT
C-30 DISTRICT SHOPPING
C-40 COMMUNITY THOROUGHFARE
C-45 COMMUNITY SHOPPING
C-51 CENTRAL BUSINESS
C-52 OLD OAKLAND
C-55 CENTRAL CORE

INDUSTRIAL ZONING
M-10 SPECIAL
M-20 LIGHT

SPECIAL ZONING
S-2 CIVIC CENTER
S-4 DESIGN REVIEW
S-7 PRESERVATION
S-8 URBAN STREET
S-12 RESIDENTIAL PARKING
S-17 DOWNTOWN RESIDENTIAL

N

0 400 800
FEET

FIGURE IV.B-5

Oakland Measure DD
Lake Merritt and Lake Merritt Channel Zoning Designations

SOURCE: CITY OF OAKLAND, 2007

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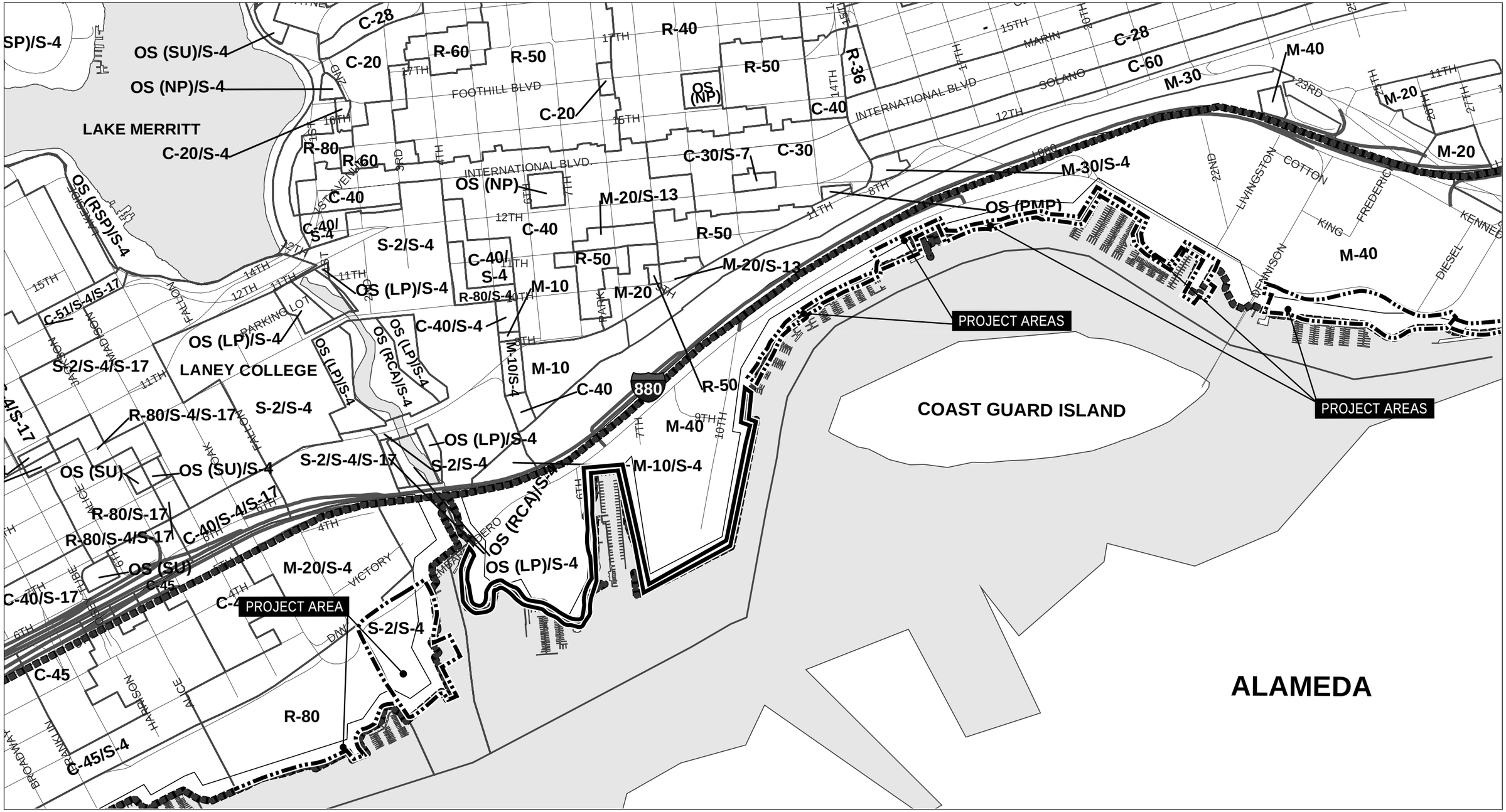

LSA

LEGEND

- PROJECT AREA FOR WATERFRONT TRAIL GROUP
- PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS
- ESTUARY POLICY PLAN AREA
- ZONING BOUNDARY

0 400 800 FEET

RESIDENTIAL ZONING
- R-30 ONE-FAMILY
- R-36 SMALL LOT
- R-40 GARDEN APARTMENT
- R-50 MEDIUM DENSITY
- R-60 MEDIUM HIGH DENSITY
- R-80 HIGH-RISE APARTMENT

OPEN SPACE ZONING
- OS (LP) LINEAR PARK
- OS (NP) NEIGHBORHOOD PARK
- OS (PMP) PASSIVE MINI-PARK
- OS (RCA) RESOURCE CONSERVATION AREA
- OS (SU) SPECIAL USE

COMMERCIAL ZONING
- C-20 SHOPPING CENTER
- C-28 COMMERCIAL SHOPPING DIST.
- C-30 DISTRICT SHOPPING
- C-40 COMMUNITY THOROUGHFARE
- C-45 COMMUNITY SHOPPING
- C-51 CENTRAL BUSINESS
- C-60 CITY SERVICE

INDUSTRIAL ZONING
- M-10 SPECIAL
- M-20 LIGHT
- M-30 GENERAL
- M-40 HEAVY

SPECIAL ZONING
- S-2 CIVIC CENTER
- S-4 DESIGN REVIEW
- S-13 MIXED USE DEVELOPENT
- S-15 TRANSIT-ORIENTED DEVELOPMENT
- S-17 DOWNTOWN RESIDENTIAL USABLE OPEN SPACE

FIGURE IV.B-6a

Oakland Measure DD
Waterfront A
Zoning Designations

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007
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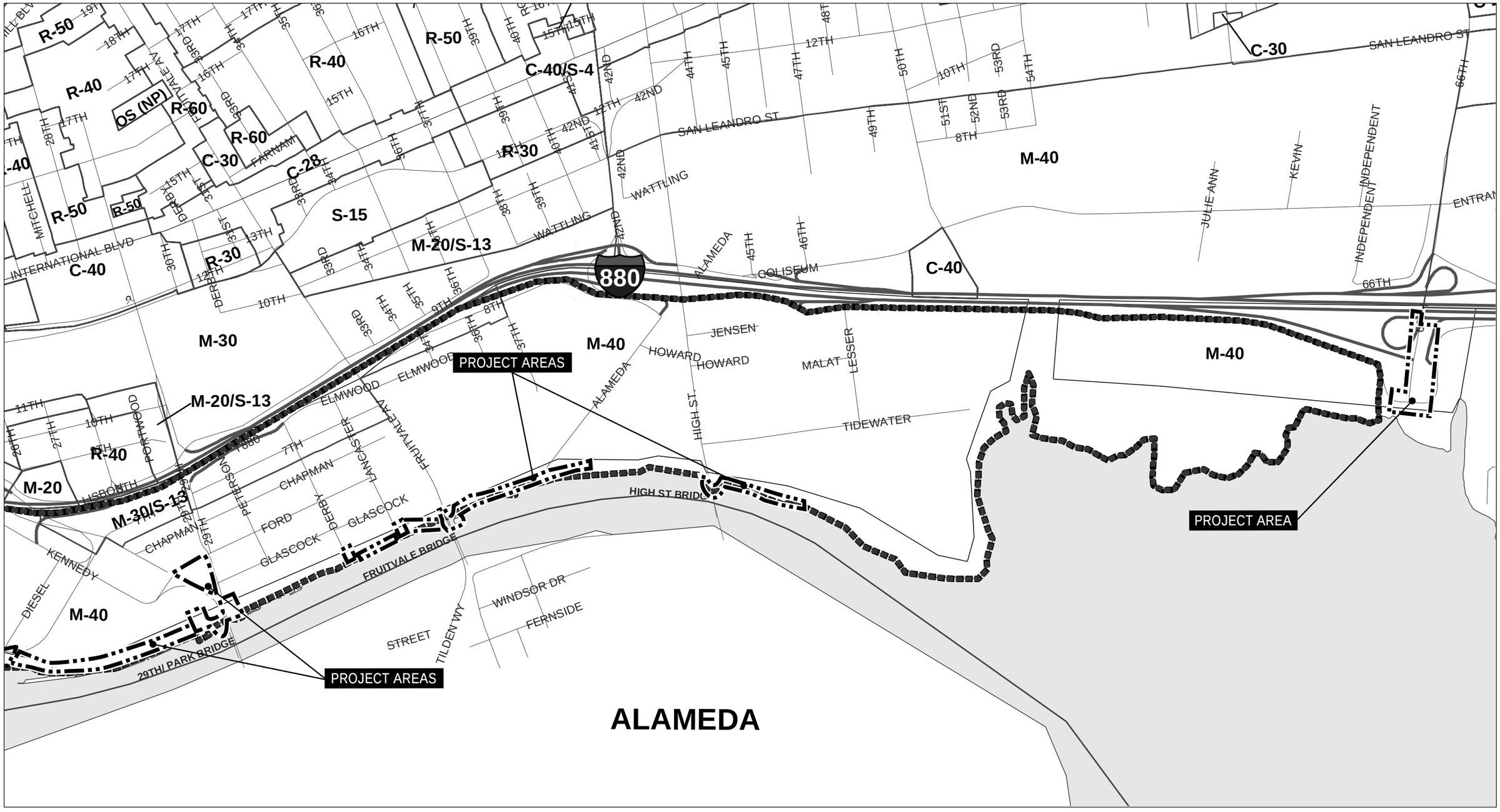

LSA

LEGEND

- PROJECT AREA FOR WATERFRONT TRAIL GROUP
- ESTUARY POLICY PLAN AREA
- ZONING BOUNDARY

0 400 800 FEET

RESIDENTIAL ZONING
- R-30 ONE-FAMILY
- R-36 SMALL LOT
- R-40 GARDEN APARTMENT
- R-50 MEDIUM DENSITY
- R-60 MEDIUM HIGH DENSITY
- R-80 HIGH-RISE APARTMENT

OPEN SPACE ZONING
- OS (LP) LINEAR PARK
- OS (NP) NEIGHBORHOOD PARK
- OS (PMP) PASSIVE MINI-PARK
- OS (RCA) RESOURCE CONSERVATION AREA
- OS (SU) SPECIAL USE

COMMERCIAL ZONING
- C-20 SHOPPING CENTER
- C-28 COMMERCIAL SHOPPING DIST.
- C-30 DISTRICT SHOPPING
- C-40 COMMUNITY THOROUGHFARE
- C-45 COMMUNITY SHOPPING
- C-51 CENTRAL BUSINESS
- C-60 CITY SERVICE

INDUSTRIAL ZONING
- M-10 SPECIAL
- M-20 LIGHT
- M-30 GENERAL
- M-40 HEAVY

SPECIAL ZONING
- S-2 CIVIC CENTER
- S-4 DESIGN REVIEW
- S-13 MIXED USE DEVELOPENT
- S-15 TRANSIT-ORIENTED DEVELOPMENT
- S-17 DOWNTOWN RESIDENTIAL USABLE OPEN SPACE

SOURCE: CITY OF OAKLAND; LSA ASSOCIATES, INC., 2007
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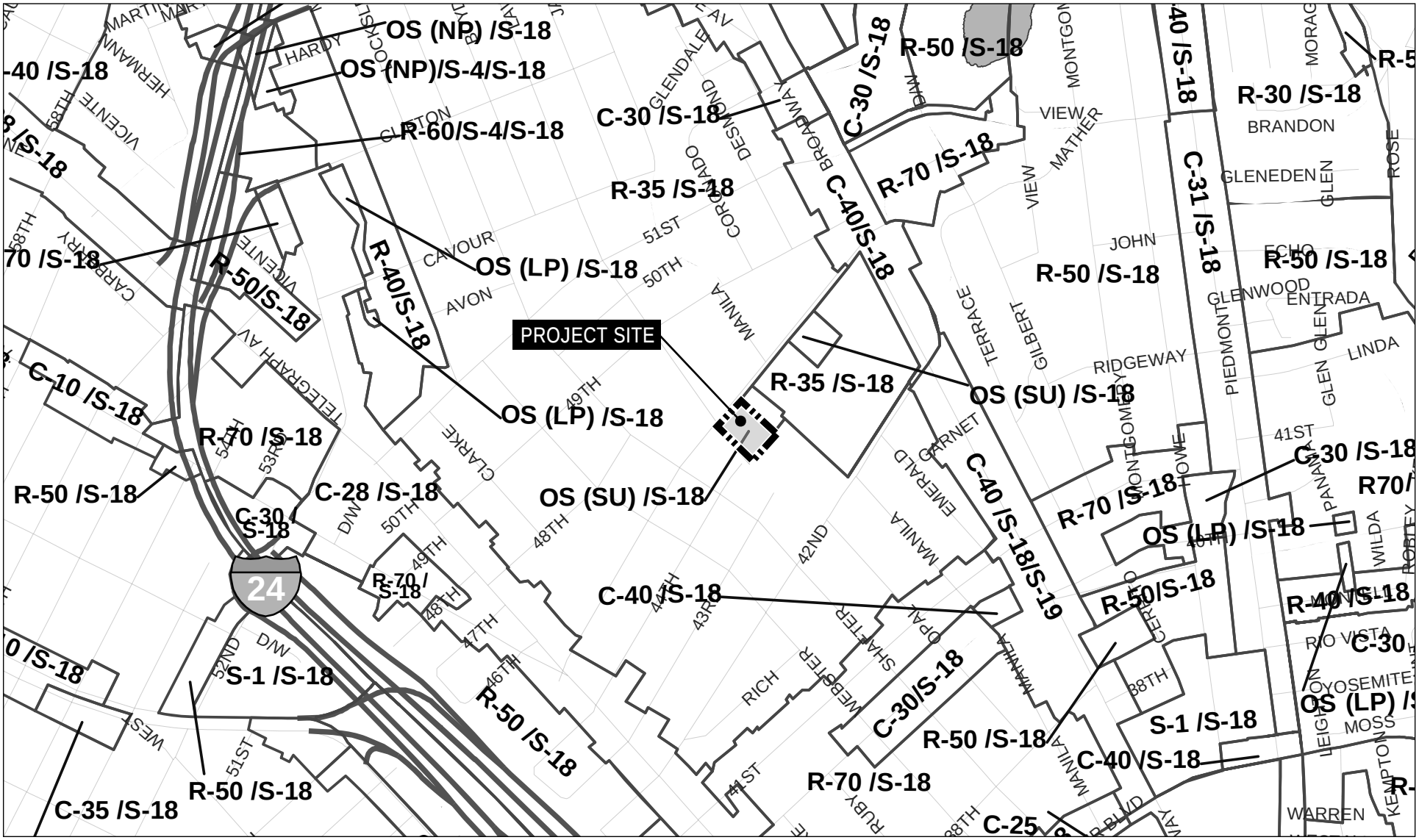
FIGURE IV.B-6b

Oakland Measure DD
Waterfront B
Zoning Designations



LSA

LEGEND

RESIDENTIAL ZONING
R-30 ONE-FAMILY
R-35 SPECIAL ONE-FAMILY
R-40 GARDEN APARTMENT
R-50 MEDIUM DENSITY
R-60 MEDIUM HIGH DENSITY

OPEN SPACE ZONING
OS (LP) LINEAR PARK
OS (NP) NEIGHBORHOOD PARK
OS (SU) SPECIAL USE

COMMERCIAL ZONING
C-28 COMMERCIAL SHOPPING
C-30 DISTRICT SHOPPING
C-40 COMMUNITY THOROUGHFARE

SPECIAL ZONING
S-1 MEDICAL CENTER
S-4 DESIGN REVIEW
S-18 MEDIATED RESIDENTIAL DESIGN
S-19 BROADWAY AUTO ROW

STUDIO ONE PROJECT SITE
ZONING BOUNDARY

FIGURE IV.B-7

Oakland Measure DD
Studio One
Zoning Designations

SOURCE: CITY OF OAKLAND, 2007
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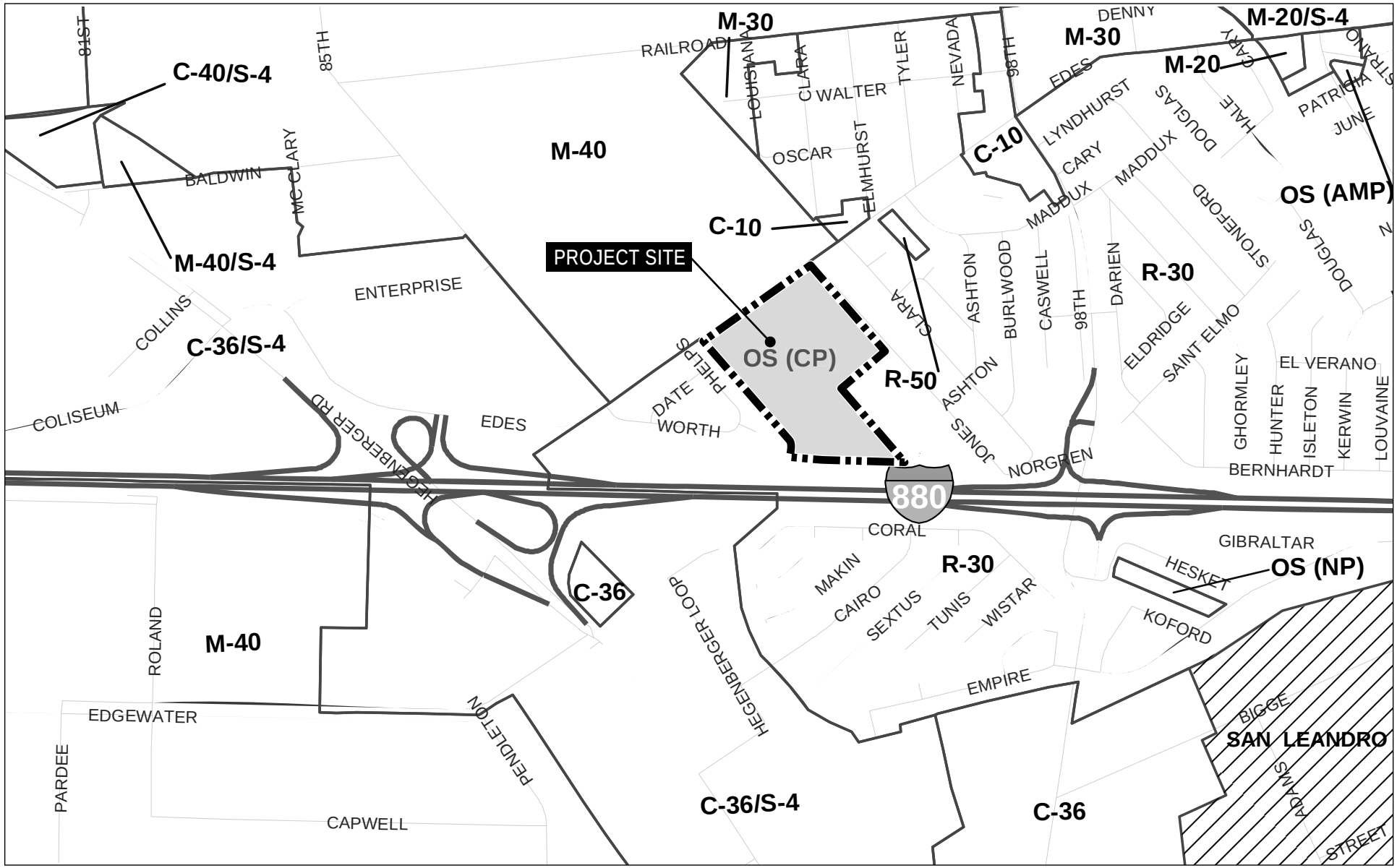

LSA

LEGEND

RESIDENTIAL ZONING
R-30 ONE-FAMILY
R-50 MEDIUM DENSITY

OPEN SPACE ZONING
OS (CP) COMMUNITY PARK
OS (AMP) ACTIVE MINI PARK

COMMERCIAL ZONING
C-10 LOCAL RETAIL
C-36 BOULEVARD SERVICE
C-40 COMMUNITY THOROUGHFARE

INDUSTRIAL ZONING
M-20 LIGHT
M-30 GENERAL
M-40 HEAVY

SPECIAL ZONING
S-4 DESIGN REVIEW

ZONING BOUNDARY
EAST OAKLAND SPORTS COMPLEX PROJECT SITE
CITY OF SAN LEANDRO

0 400 800
FEET

SOURCE: CITY OF OAKLAND, 2007.

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FIGURE IV.B-8

Oakland Measure DD
East Oakland Sports Complex
Zoning Designations

Table IV.B-2: Planning Codes Designation

Zoning Designation	Intent of Classification
Lake Merritt and Lake Merritt Channel	
Open Space (OS)	The OS zone is intended to create, preserve, and enhance land for permanent open space to meet the active and passive recreational needs of Oakland residents and to promote park uses which are compatible with surrounding land uses and the city's natural environment. The zone is typically appropriate in areas of public open space only.
Resource Conservation Area (RCA)	
Region Serving Park (RSP)	
Special Use Park (SU)	
Neighborhood Park (NP)	
Linear Park (LP)	
High Density Residential (R-70)	The R-70 zone is intended to create, preserve, and enhance areas for apartment living at high densities in desirable settings, and is typically appropriate to areas having good accessibility to transportation routes and major shopping and community centers.
High Rise Apartment Residential (R-80)	The R-80 zone is intended to create, preserve, and enhance areas for high-rise apartment living at high densities in desirable settings, and is typically appropriate to areas near major shopping and community centers and rapid transit stations.
Downtown Apartment Residential (R-90)	The R-90 zone is intended to create, preserve, and enhance areas for high-rise apartment living at very high densities in desirable settings, and is typically appropriate to areas within, or in close proximity to, the Oakland central district.
Neighborhood Commercial (C-5)	The C-5 zone is intended to create, preserve, and enhance small scale retail neighborhood serving activities that typically do not generate significant amounts of traffic or parking or significantly impair views, and are compatible with adjacent residential uses and existing vistas and panoramas.
District Thoroughfare Commercial (C-30)	The C-30 zone is intended to create, preserve, and enhance areas with a wide range of retail establishments serving both short and long term needs in convenient locations, and is typically appropriate along major thoroughfares.
Community Thoroughfare Commercial (C-40)	The C-40 zone is intended to create, preserve, and enhance areas with a wide range of both retail and wholesale establishments serving both short and long term needs in convenient locations, and is typically appropriate along major thoroughfares.
Central Core Commercial (C-55)	The C-55 zone is intended to preserve and enhance a very high-intensity regional center of employment, shopping, culture, and recreation, and is appropriate to the core of the central district.
Heavy Industrial (M-40)	The M-40 zone is intended to create, preserve, and enhance areas containing manufacturing or related establishments which are potentially incompatible with most other establishments, and is typically appropriate to areas which are distant from residential areas and which have extensive rail or shipping facilities.
Medical Center (S-1)	The S-1 zone is intended to create, preserve, and enhance areas devoted primarily to medical facilities and auxiliary uses, and is typically appropriate to compact areas around large hospitals.
Civic Center (S-2)	The S-2 zone is intended to create, preserve, and enhance areas devoted primarily to major public and quasi-public facilities and auxiliary uses, and is typically appropriate to portions of the Oakland Central District and to outlying areas of public facilities.
Design Review Combining (S-4)[a]	The S-4 zone is intended to create, preserve, and enhance the visual harmony and attractiveness of areas which require special treatment and the consideration of relationships between facilities, and is typically appropriate to areas of special community, historical, or visual significance.

Table IV.B-2 *Continued*

Zoning Designation	Intent of Classification
Preservation Combining (S-7) [a]	The S-7 zone is intended to preserve and enhance the cultural, educational, aesthetic, environmental, and economic value of structures, other physical facilities, sites, and areas of special importance due to historical association, basic architectural merit, the embodiment of a style or special type of construction, or other special character, interest, or value, and is typically appropriate to selected older locations in the city.
Residential Parking Combining (S-12) [a]	The S-12 zone is intended to create, preserve, and enhance areas with high concentrations of Residential Facilities, to ensure that adequate off-street parking is provided for those facilities, and to maximize the general availability of on-street parking, and is typically appropriate in high density residential neighborhoods, adjacent commercial areas, and other neighborhoods where high concentrations of Residential Facilities may contribute to on-street parking congestion.
Downtown Residential Open Space Combining (S-17) [a]	The S-17 zone is intended to provide open space standards for residential development that are appropriate to the unique density, urban character and historic character of the central business district.
Waterfront Trail	
Civic Center (S-2)	*Please see description above.*
Design Review Combining (S-4) [a]	*Please see description above.*
Heavy Industrial (M-40)	*Please see description above.*
High Rise Apartment Residential (R-80)	*Please see description above.*
Studio One	
Open Space (OS)	*Please see description above.*
Special Use Park (SU)	
Mediated Residential Design Review Combining (S-18) [a]	The S-18 zone is intended to offer owners of properties in close proximity to projects that involve new construction of one or two dwelling units on a lot, or upper story additions to such dwelling units, an opportunity to resolve directly with the project applicant or the applicant's representatives, through mediation, any issues concerning the project design, and especially issues concerning the project's massing or bulk and any view, privacy and solar access impacts of the project on neighboring properties.
East Oakland Sports Complex	
Open Space (OS)	*Please see description above.*
Community Park (CP)	

[a] These districts are combining districts, which provided augmented regulations for the base districts in which they are located.

Source: City of Oakland, 2007.

C. TRANSPORTATION, CIRCULATION AND PARKING

This section describes the existing traffic and circulation, parking and transit conditions for the Measure DD Implementation Project component sites. This section also identifies potential impacts to the transportation network that may result from implementation of Measure DD and recommends mitigation measures to reduce potentially significant impacts, as appropriate.

The section is organized differently than other sections of the EIR due to the complexity of the traffic analysis; the setting, impacts and mitigation are organized by project group. The discussion of each group includes a brief description of the components as they relate to transportation; the methods used for analysis; the existing conditions and applicable regulations; and the potential impacts and mitigation measures. Three of the four groups (Groups 1 through 3) have some potential to cause impacts to transportation, circulation or parking. The fourth, the City-wide Creeks group, would not yield any impact to the transportation and circulation network and is not discussed further within this section.

1. Lake Merritt and Lake Merritt Channel (Group 1)

The Lake Merritt and Lake Merritt Channel group includes roadway improvements in three areas: Lakeshore Avenue, Lakeside Drive/Harrison Street, and 12th Street. The transportation and circulation analysis focuses on these areas.

The transportation and circulation improvements associated with Group 1 would contain the following elements:

- Reconfiguration of El Embarcadero between Grand Avenue and Lakeshore Avenue;
- Reconfiguration of 12th Street with improved pedestrian and bicycle access;
- Reconfiguration of the Snow Park/Lakeside-Harrison-20th Street intersection;
- Narrowing of Lakeside Drive at 13th Street to three lanes, then just north of 14th Street to two lanes with Class II bike lane;
- Narrowing of southbound Harrison Street from Grand Avenue to just north of its intersection with Lakeside Drive to three lanes with a Class II bike lane that would extend to Madison Street; and
- Narrowing of Lakeshore Avenue between E. 18th Street and just south of El Embarcadero to two travel lanes with left-turn lanes and installation of Class II bike lanes.

During the project design process, two project development scenarios were studied: the project as defined in the Project Description; and a "No El Embarcadero" scenario, where El Embarcadero would be closed entirely between Grand Avenue and Lakeshore Avenue. Because the preliminary traffic analysis for the No El Embarcadero scenario showed substantial impacts to the Lake Park and Lakeshore Avenue intersection and other nearby intersections, closure of El Embarcadero was dropped from further consideration. The results of the preliminary traffic analysis for the No El Embarcadero scenario are provided in Appendix E.

As part of the project, Lakeshore Avenue may be reconfigured in one of two different ways. Variant A assumes that left-turn pockets would be installed on Lakeshore Avenue. Variant B assumes that a two-way left-turn lane would be installed on Lakeshore Avenue. As Variants A and B would

essentially function in the same manner operationally, they were not analyzed separately but are discussed qualitatively and referred to collectively as the project in the discussion and analysis.

a. Setting (Group 1). This section discusses the methods used for analyzing transportation systems, the applicable regulations, and the existing site conditions for the Lake Merritt and Lake Merritt Channel group.

(1) Methods. Potential impacts that Group 1 components may have on transportation systems were evaluated with respect to roadways, transit, and bicycle and pedestrian facilities as described in the following paragraphs.

Roadways. Levels of service (LOS) at 55 intersections within the Lake Merritt and Lake Merritt Channel group were evaluated for weekday morning (AM) and evening (PM) peak hours. The intersections identified as having the greatest potential for traffic impacts were assessed under the following conditions:

- Existing Conditions
- Existing Conditions Plus Project (Variant A or B)
- Cumulative Conditions (2025)
- Cumulative Conditions (2025) Plus Project (Variant A or B)

The LOS at each study area intersection was analyzed for the AM and PM peak hours using methodologies described in the Highway Capacity Manual.[1] The LOS for signalized and unsignalized intersections is defined in terms of delay, which is a complex measure dependent upon a number of variables. The most basic of these is the number of vehicles in the traffic stream, but for signalized intersections, delay is also dependent on the quality of signal progression, the signal cycle length, and the "green" ratio for each approach or lane group. The LOS criteria for signalized intersections are presented in Table IV.C-1. For intersections with one or two stop signs, delay is dependent on the number of gaps available in the uncontrolled traffic stream. The LOS criteria for unsignalized intersections are presented in Table IV.C-2.

In addition, the intersection of Lake Park Avenue and Lakeshore Avenue was also analyzed for Saturday peak hour to evaluate the potential impacts of the project during the operation of Lake Merritt Farmer's Market.

Transit System. The Highway Capacity Manual arterial analysis method was used to evaluate potential impacts to primary bus routes during weekday morning and evening peak hours. The arterial analysis considers travel times, average speeds, parking movements, and arterial LOS. The transit corridors studied include:

- Eastbound 12th Street from Madison Street to 2nd Avenue along E. 15th Street
- Westbound 12th Street from 2nd Avenue along Foothill Boulevard to Madison Street
- Harrison Street from Grand Avenue to 20th Street in both directions.

[1] *Highway Capacity Manual, 2000*. Transportation Research Board.

Table IV.C-1: Level of Service Criteria – Signalized Intersections

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	> 10 and < 20	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	> 20 and < 35	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (to service all waiting vehicles) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	> 35 and < 55	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 and < 80	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	> 80	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with over-saturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at nearly saturated conditions with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Source: Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, pages 10-16 and 16-2.

Table IV.C-2: Level of Service Criteria – Stop-Controlled Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: Transportation Research Board, *Highway Capacity Manual*, Washington, D.C., 2000, pages 10-16 and 16-2.

Bicycle and Pedestrian Facilities. Potential impacts to bicycle and pedestrian facilities were assessed by evaluating whether the project group would substantially increase traffic hazards or conflict with adopted policies, plans, or programs supporting bicycle and pedestrian mobility.

(2) Existing Conditions. The existing transportation setting within the Group 1 area is described in this section. The local roadway network is described and current conditions at the study intersections are summarized. Transit system and bicycle and pedestrian facilities are also discussed.

Roadways. The Group 1 area roadway network is shown in Figure IV.C-1. The local street network that serves the Lake Merritt area is described below. The regional transportation system is not expected to be significantly impacted by Group 1 components of Measure DD because any effects, such as traffic diversions, would occur close to the project vicinity and impact primarily the local roadway network.

- Grand Avenue runs from I-80 west of the project area to beyond I-580 to the east. Along much of its length it has two lanes in each direction along with bike lanes. Grand Avenue generally forms the northern boundary of the project area around Lake Merritt.
- Santa Clara Avenue is a four-lane arterial that crosses Grand Avenue and provides access to and from I-580 west of Grand Avenue.
- Lake Park Avenue is a half-mile long street that links MacArthur Boulevard east of the project area to Grand Avenue where it becomes Santa Clara Avenue and provides access to I-580. It operates one-way westbound between MacArthur Boulevard and Lakeshore Avenue.
- MacArthur Boulevard runs parallel to and southwest of I-580 from Oakland Avenue to 14th Avenue and provides several access points to and from eastbound I-580. In the project area it is one-way eastbound with four lanes between Grand Avenue and Lakeshore Avenue.
- El Embarcadero is a four-lane divided roadway connection between Grand Avenue and Lakeshore Avenue with an approximately 100-foot-wide median separating the directions of travel.
- Lakeshore Avenue is a one-mile-long, four-lane road that runs along the eastern shore of Lake Merritt. Lakeshore Avenue forms most of the eastern boundary of the project area around Lake Merritt. At its southern end, Lakeshore Avenue connects directly to 12th Street.
- 1st Avenue is a four-lane road that provides a direct connection between Lakeshore Avenue and 12th Street along the southeast side of Lake Merritt. It has two eastbound lanes and one westbound lane between E. 14th and E. 15th Streets and three eastbound lanes and two westbound lanes north of E. 15th Street.
- 2nd Avenue is a two-lane two-way street that extends from 10th Street to E. 18th Street.
- 5th Avenue runs from the Oakland Inner Harbor north to Park Boulevard. In the project vicinity, it has two travel lanes.
- 12th Street is a 12-lane divided roadway that crosses the Lake Merritt Channel. Grade-separations and ramps connect 12th Street to 1st Street, E. 12th Street and Lakeshore Avenue on its east end and to 11th, 13th, 14th Streets and Lakeside Drive at the west side of the Lake Merritt Channel. As 12th Street approaches Oak Street, it becomes one-way westbound as part of the downtown grid street system.
- E. 18th Street operates from Lakeshore Avenue to 14th Avenue. In the project vicinity, it is a four-lane roadway with a median.
- Foothill Boulevard is an arterial roadway that runs from Lakeshore Avenue east and terminates at MacArthur Boulevard in East Oakland near Evergreen Cemetery. In the project vicinity, it is a two-lane street serving traffic one-way toward Lake Merritt. It forms a one-way couplet with E. 15th Street.
- E. 15th Street is a local road that extends from 1st Avenue to 14th Avenue as an eastbound one-way street. East of 14th Avenue, it continues as a two-way roadway to just east of 26th Avenue.

LSA

FIGURE IV.C-1

N

NOT TO SCALE

LEGEND

EXISTING INTERSECTION

NEW INTERSECTION

Oakland Measure DD
Study Intersections

SOURCE: DOWLING ASSOCIATES, INC., 2007.

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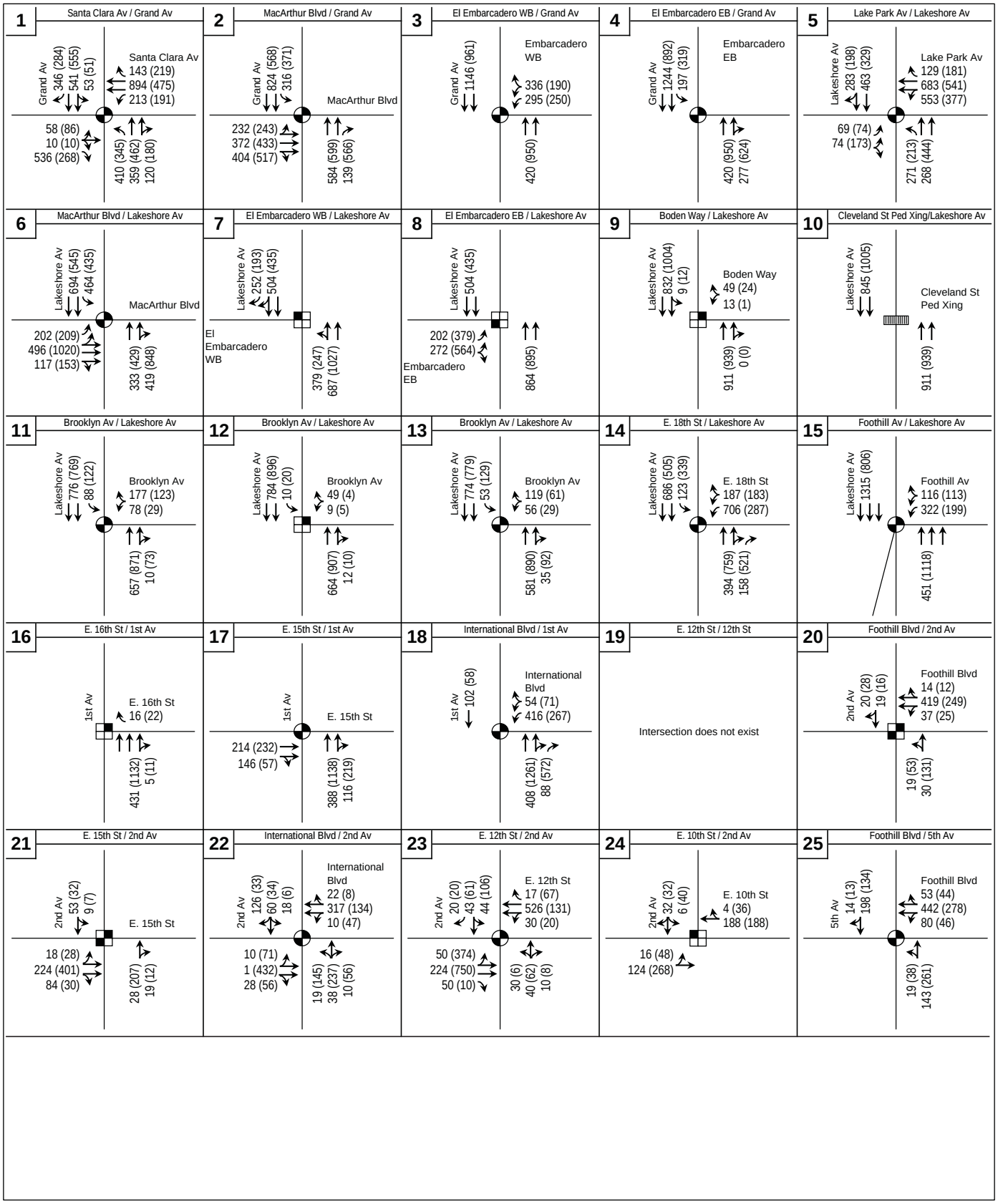
- International Boulevard (E. 14th Street) is a four-lane arterial generally having no left-turn lanes except at its intersection with 1st Avenue.
- E. 12th Street is a four-lane arterial roadway with no left-turn lanes and ramp-like connections to the east end of 12th Street and 1st Avenue.
- 14th Street is a four-lane two-way arterial roadway that connects to the west side of 12th Street at the west side of the Lake Merritt Channel.
- 11th and 13th Streets are four-lane eastbound one-way streets that connect to 12th Street via ramps at the west side of the Lake Merritt Channel.
- 10th Street is a four-lane one-way westbound street west of Madison Street. Between Madison and Oak Streets, 10th Street is a four-lane two-way street transitioning to two lanes east of Oak Street.
- 8th Street is a four-lane westbound street that forms a one-way couplet with the four-lane eastbound 7th Street west of Fallon Street. 8th Street terminates at Fallon Street.
- 7th Street is a two-way four-lane divided roadway east of Fallon Street. East of Lake Merritt Channel, it swings to the north and becomes E. 8th Street.
- Embarcadero is an east-west roadway that travels for about one mile along the Oakland Estuary from west of Market Street to Oak Street, where it continues as Embarcadero East. Railroad tracks that are actively being used by Amtrak and other commercial transportation companies are found along Embarcadero.
- Harrison Street has four southbound lanes and five northbound lanes between Thomas L. Berkley Way (20th Street) and Grand Avenue. There are three lanes in each direction between Grand Avenue and 27th Street, with two lanes each direction north of 27th Street and south of Thomas L. Berkley Way (20th Street).
- 20th Street is a four-lane east-west roadway that runs between Lake Merritt and Castro Street in the project vicinity.
- Madison Street operates one-way southbound from Lakeside Drive towards the Oakland Estuary, terminating at the railroad tracks just before Embarcadero. In the project area, Madison Street has three travel lanes with metered parking on both sides of the street to the north of 11th Street and a combination of unrestricted and 2 hour parking to the south of 11th Street.
- Oak Street is a two-way street from Embarcadero to 6th Street and one-way northbound from 6th Street to International Boulevard, where it becomes Lakeside Drive at 14th Street. Oak Street is a four-lane roadway in the project vicinity and provides access to and from I-880 at 5th and 6th Streets. Metered parallel parking is provided on the west side of the street.
- Lakeside Drive is a one-way northbound four-lane roadway from 14th Street to just south of 17th Street, where it is reduced to three lanes northbound to Madison Street. From Madison Street to Harrison Street/20th Street, Lakeside Drive is a four-lane two-way street. Lakeside Drive has parking along both sides from 14th Street to Jackson Street.

Existing Traffic Volumes. Existing weekday AM and PM peak-hour traffic turning movement counts were collected at all study intersections within the last three years. Three years is considered acceptable by the City as traffic volumes tend to be relatively stable over that length of time. New traffic counts were collected in the winter of 2006 for intersections where recent count data were not available. Saturday peak hour traffic counts were collected at the intersection of Lake Park Avenue and Lakeshore Avenue in Spring 2007 in order to evaluate the project's impacts within the context of the nearby Saturday farmer's market. Intersection turning volumes are shown in Figures IV.C-2a and IV.C-2b.



LSA

NOT TO SCALE

KEY

31 (27) = AM (PM) peak hour traffic volume

= Signalized intersection

= Intersection approach lane

= Intersection with one stop sign

= Intersection with two-way stop sign

= Intersection with three-way stop sign

FIGURE IV.C-2a

Oakland Measure DD

Existing Traffic Volumes, Lanes, and Traffic Controls

SOURCE: DOWLING ASSOCIATES, INC., 2007.

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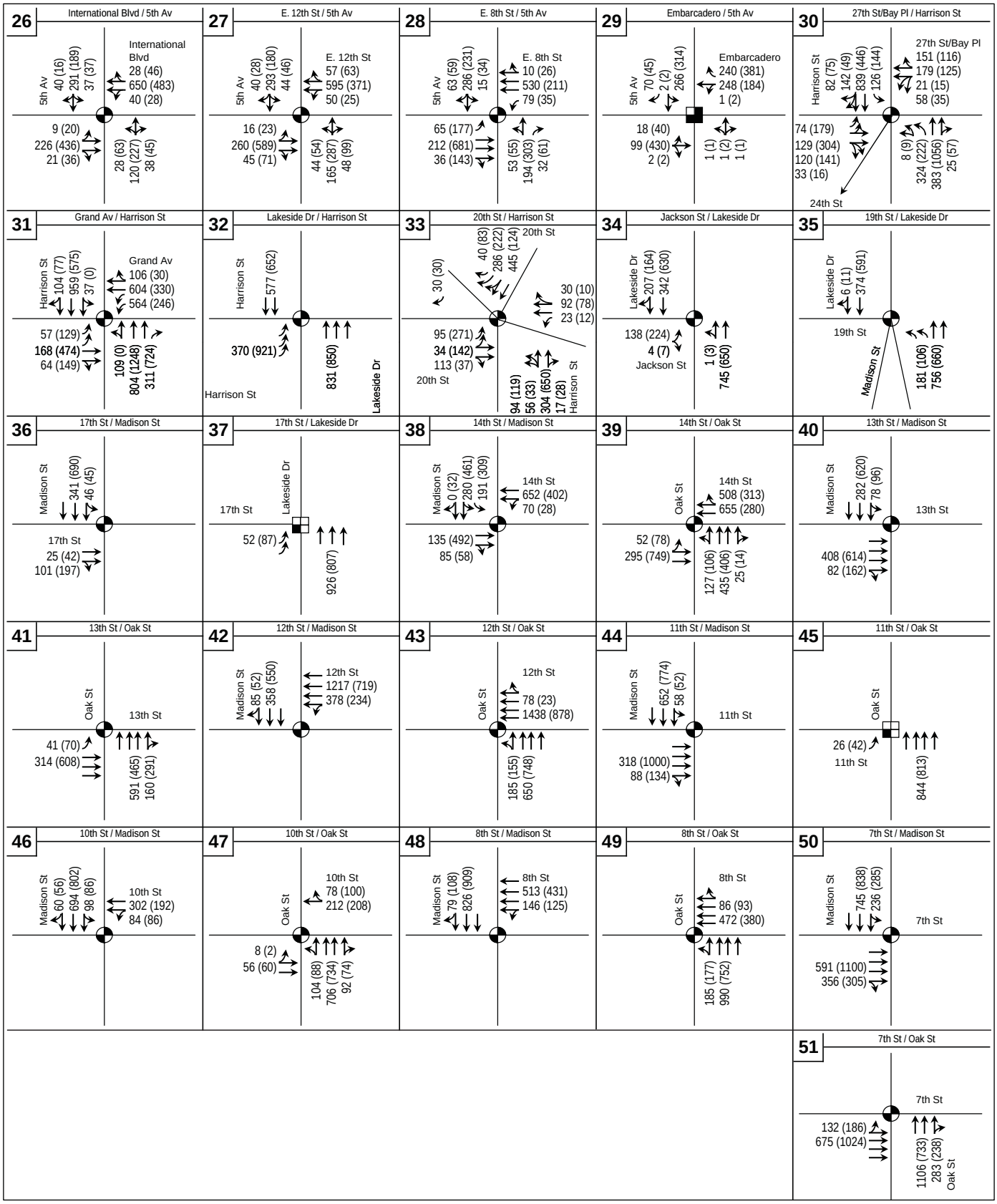

LSA

NOT TO SCALE

KEY

31 (27) = AM (PM) peak hour traffic volume
= Signalized intersection
= Intersection approach lane
= Intersection with one stop sign
= Intersection with two-way stop sign
= Intersection with three-way stop sign

FIGURE IV.C-2b

Oakland Measure DD
Existing Traffic Volumes, Lanes, and Traffic Controls

SOURCE: DOWLING ASSOCIATES, INC., 2007.

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Existing Conditions. The existing LOS at the study intersections are summarized in Table IV.C-3. LOS calculation worksheets are included in Appendix E. Currently, seven study intersections operate below City of Oakland's LOS standards (at or below Level E):

- Santa Clara Avenue/Grand Avenue intersection operates at LOS E during the AM peak hour
- Lake Park Avenue/Lakeshore Avenue intersection operates at LOS E during the AM peak hour
- MacArthur Boulevard/Lakeshore Avenue intersection operates at LOS F during the PM peak hour
- El Embarcadero (EB)/Lakeshore Avenue intersection operates at LOS E and LOS F during the AM and PM peak hours, respectively
- E. 18th Street/Lakeshore Avenue intersection operates at LOS E during the PM peak hour
- Embarcadero/5th Avenue intersection operates at LOS E during the PM peak hour
- 27th Street/Bay Place/Harrison Street intersection operates at LOS F during the AM peak hour

The Lake Park Avenue/Lakeshore Avenue intersection is operating at LOS C during the Saturday peak hour with an average intersection delay of 25.1 seconds.

The existing travel times and speeds along 12th Street and Harrison Street are summarized in Table IV.C-4.

Transit System. The project area is served by a large number of AC Transit bus routes. The following routes have the greatest potential to be impacted by the Lake Merritt and Lake Merritt Channel group:

- Routes that link downtown to East Oakland via 12th Street or 14th Street may be affected by the 12th Street reconfiguration, and include Routes 1, 1R, 13, 14, 18, 40, 801, and 840.
- Routes 11, 805 and NL run on Harrison Street and Route 59 runs along a portion of Lakeside Drive. These routes may be affected by the proposed narrowing of Harrison Street and Lakeside Drive.

Currently, all arterials along primary bus routes operate within City LOS standards, which allow LOS E traffic conditions in the area west of Lake Merritt. AC Transit is proposing Bus Rapid Transit (BRT) improvements that would create bus lanes and BRT stations on arterial streets in the cities of Berkeley, Oakland, and San Leandro. The project would include specially designed passenger boarding platforms, shelters, NextBus signs and bus priority at traffic signals. The new service would operate primarily on Telegraph Avenue, International Boulevard and East 14th Street. The cumulative transportation analysis assumed that these improvements would be implemented.

Bicycle and Pedestrian Facilities. Bicycle facilities in the Lake Merritt area are limited and disconnected. Class II bike lanes are found along Grand Avenue from El Embarcadero west to Webster Street then continue as both Class II and Class III facilities to terminate at Market Street. A Class III bike route extends west along 20th Street from the lake. Another Class III facility connects 1st Avenue to 2nd Avenue via E. 15th Street then turns southward to Channel Park. Lastly, a Class I bike path runs along Channel Park to terminate near the intersection of 4th Street and Oak Street. These facilities are shown in Figure IV.C-3. Pedestrian facilities such as sidewalks and crosswalks are found throughout the project area. Figure IV.C-4 shows the existing pedestrian crosswalks in the area.

Table IV.C-3: Intersection Levels of Service – Existing Conditions

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		LOS[b]	Delay[c]	LOS[b]	Delay[c]
1. Santa Clara Ave/Grand Ave[a]	Signal	**E**	61.6	D	46.4
2. MacArthur Blvd/Grand Ave	Signal	C	26.0	C	29.2
3. El Embarcadero (WB)/Grand Ave	Signal	B	14.1	A	9.1
4. El Embarcadero (EB)/Grand Ave	Signal	A	4.7	C	21.7
5. Lake Park Ave/Lakeshore Ave	Signal	**E**	77.2	D	35.2
6. MacArthur Blvd/Lakeshore Ave	Signal	D	36.0	**F**	89.3
7. El Embarcadero (WB)/Lakeshore Ave [f]	Minor Stop	N/A	N/A	N/A	N/A
8. El Embarcadero (EB)/Lakeshore Ave	Minor Stop	**E**	38.2	**F**	180.2
9. Boden Way/Lakeshore Ave	Minor Stop	C	23.0	B	13.9
10. Cleveland St/Lakeshore Ave	Ped Xing	A	2.1	A	2.2
11. Brooklyn Ave/Lakeshore Ave	Signal	A	8.0	A	7.3
12. Wesley Ave/Lakeshore Ave	Minor Stop	C	15.1	C	24.5
13. Hanover Ave/Lakeshore Ave	Signal	B	13.5	B	19.1
14. E. 18th St/Lakeshore Ave	Signal	C	30.6	**E**	55.7
15. Foothill Blvd/Lakeshore Ave	Signal	B	14.3	C	27.7
16. E. 16th St/1st Ave	Minor Stop	B	10.6	B	13.5
17. E. 15th St/1st Ave	Signal	B	15.2	C	20.8
18. E. 14th St/1st Ave	Signal	B	15.7	C	27.1
19. E. 12th St/1st Ave		Future Intersection			
20. Foothill Blvd/2nd Ave	Minor Stop	C	15.7	C	15.5
21. E. 15th St/2nd Ave	Minor Stop	B	12.7	C	18.3
22. E. 14th St/2nd Ave	Signal	A	9.6	B	19.6
23. E. 12th St/2nd Ave	Signal	B	16.4	B	17.0
24. E. 10th St/2nd Ave	Minor Stop	B	11.6	C	16.1
25. Foothill Blvd/5th Ave	Signal	B	13.2	B	13.4
26. E. 14th St/5th Ave	Signal	B	13.7	B	13.2
27. E. 12th St/5th Ave	Signal	B	12.4	B	16.4
28. E. 8th St/5th Ave	Signal	B	11.5	B	13.3
29. Embarcadero /5th Ave	Minor Stop	B	12.5	**E**	39.0
30. 27th St/Bay Pl/Harrison St	Signal	**F**	146.3	C	31.8
31. Grand Ave/Harrison St [e]	Signal	D	39.4	C	34.8
32. Harrison St/Lakeside Dr [e]	Signal	A	9.1	B	13.0
33. 20th St/Harrison St [e]	Signal	D	35.5	C	34.6
34. Jackson St/Lakeside Dr [e]	Signal	A	7.2	A	8.9
35. Madison St/Lakeside Dr [e]	Signal	A	6.4	B	11.1
36. 17th St/Madison St [e]	Signal	B	12.9	B	13.6
37. 17th St/Lakeside Dr [e]	Minor Stop	B	11.8	B	11.6
38. 14th St/Madison St [e]	Signal	B	15.0	B	14.8
39. 14th St/Lakeside Dr [e]	Signal	B	13.6	B	10.9
40. 13th St/Madison St [e]	Signal	B	10.5	B	12.0
41. 13th St/Oak St [e]	Signal	B	17.7	B	16.5
42. 12th St/Madison St [e]	Signal	A	5.3	A	8.5
43. 12th St/Oak St [e]	Signal	B	13.7	B	13.5
44. 11th St/Madison St [e]	Signal	B	12.0	B	12.1
45. 11th St/Oak St [e]	Minor Stop	B	10.9	B	11.1
46. 10th St/Madison St [e]	Signal	A	5.3	A	4.5
47. 10th St/Oak St [e]	Signal	A	8.8	A	9.7
48. 8th St/Madison St [e]	Signal	A	9.2	A	8.5

Table IV.C-3 *Continued*

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		LOS[b]	Delay[c]	LOS[b]	Delay[c]
49. 8th St/Oak St [e]	Signal	B	17.1	B	16.1
50. 7th St/Madison St [e]	Signal	B	16.8	B	16.2
51. 7th St/Oak St [e]	Signal	B	13.5	B	13.3

Notes:
[a] Intersections that currently operate below the City of Oakland's LOS standards are shown in **bold**.
[b] LOS = Level of Service
[c] Average control delay in seconds per vehicle
[d] The worst approach control delays and LOS are reported for side street stop-controlled intersections.
[e] Defined as a downtown intersection
[f] LOS cannot be analyzed using HCM method under existing control configuration (stop control on southbound only)
Source: Dowling Associates, 2007.

Table IV.C-4: Travel Times and Speeds along 12th Street and Harrison Street – Existing Conditions

Roadway	Approach	Peak Hour	Travel Time (secs)	Average Speed (mph)
12th Street (Foothill Blvd to Madison Street)	EB	AM	84.9	12.4
		PM	114.9	9.2
	WB	AM	170.8	14.4
		PM	164.0	14.9
Harrison Street (Grand Avenue to 20th Street)	NB	AM	99.5	9.6
		PM	132.6	7.2
	SB	AM	133.6	7.5
		PM	136.1	7.4

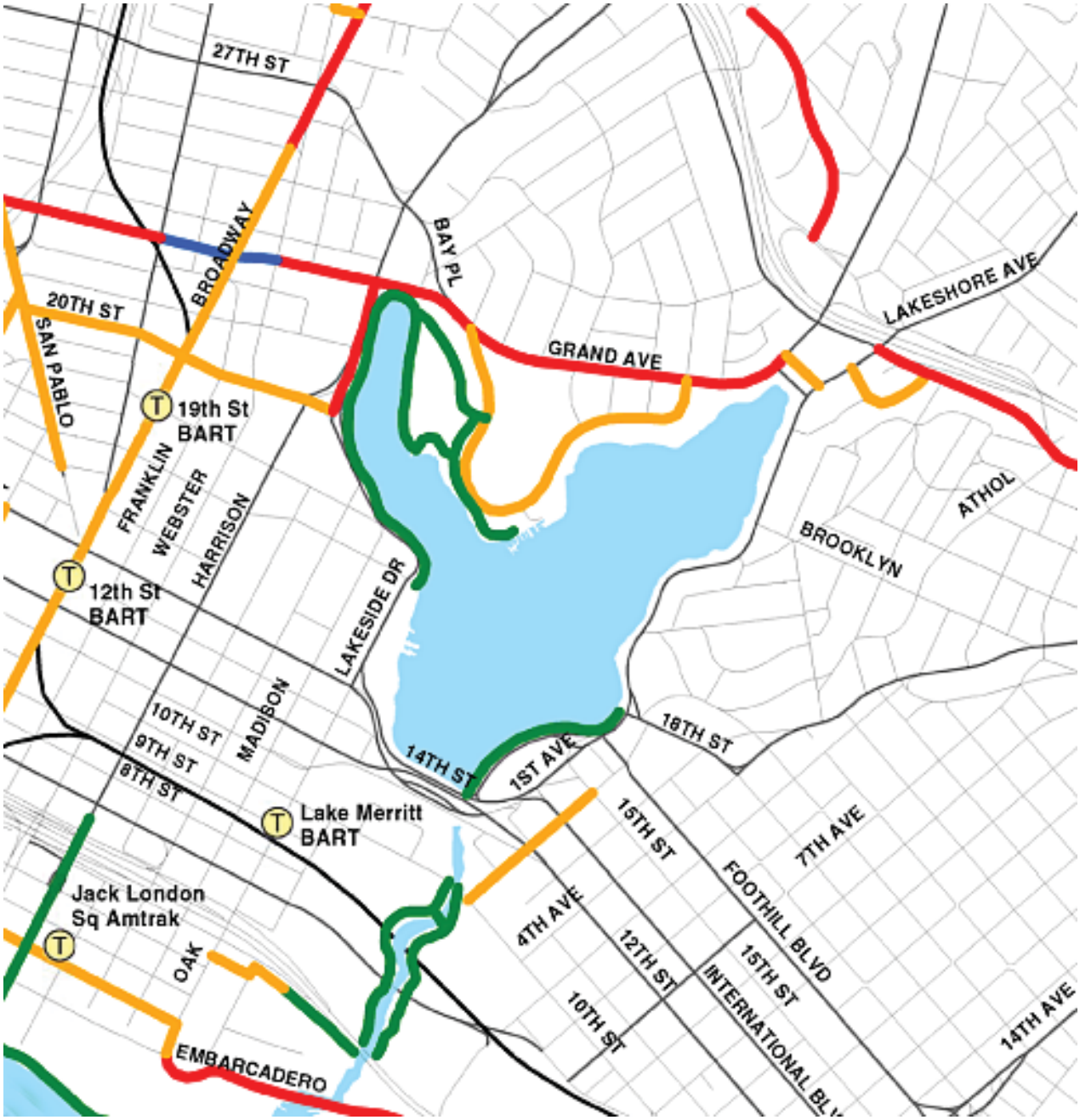
Source: Dowling Associates, 2007.

(3) Regulatory Context. Applicable laws and regulations pertaining to transportation and circulation are summarized below.

Federal. The Federal Highway Administration (FHWA) is the agency of the U.S. Department of Transportation (DOT) responsible for the federally funded roadway system, including the interstate highway network and portions of the primary state highway network. FHWA funding is provided through the Safe, Accountable, Flexible, Efficiency Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This act's legislation can be used to fund local transportation improvement projects, such as projects to improve the efficiency of existing roadways, traffic signal coordination, bikeways, and transit system upgrades.

State. The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, and maintaining all state highways. Caltrans' jurisdictional interest extends to improvements to roadways at the interchange ramps serving area freeways. Any federally funded transportation improvements would be subject to review by Caltrans staff and the California Transportation Commission.

Metropolitan Transportation Commission (MTC). The MTC is the regional organization responsible for prioritizing transportation projects in a Regional Transportation Improvement Program (RTIP) for federal and state funding. The process is based on evaluating each project for need, feasibility, and adherence to SAFETEA-LU policies and the local Congestion Management Program (CMP). The CMP requires each jurisdiction to identify existing and future transportation



LSA

N

NOT TO SCALE

LEGEND

- EXISTING BICYCLE PATH (CLASS 1)
- EXISTING BICYCLE PATH (CLASS 2)
- EXISTING BICYCLE PATH (CLASS 3)
- EXISTING ARTERIAL BIKE ROUTE (CLASS 3A)
- EXISTING BIKE BOULEVARD (CLASS 3B)
- BART/AMTRAK/FERRY STATIONS

FIGURE IV.C-3

Oakland Measure DD
Existing Bikeways

SOURCE: CITY OF OAKLAND BICYCLE MASTER PLAN UPDATE, PREPARED BY WILBUR SMITH ASSOCIATES, FEBRUARY 2007

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LSA

FIGURE IV.C-4

LEGEND

SIGNALIZED PEDESTRIAN CROSSWALKS

UNSIGNALIZED PEDESTRIAN CROSSWALKS

PEDESTRIAN TUNNELS

Oakland Measure DD

Existing Pedestrian Crosswalks

N

NOT TO SCALE

SOURCE: LAKE MERRITT PARK MASTER PLAN, CITY OF OAKLAND, JULY 2002.

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facilities that would operate below an acceptable service level and provide mitigation where future growth would degrade that service level.

The Alameda County Congestion Management Agency (CMA) is responsible for ensuring local government conformance with the CMP, a seven-year program aimed at reducing traffic congestion. The CMA has review responsibility for proposed development actions expected to generate 100 or more PM peak-hour trips than would otherwise occur. The CMA reviews the adequacy of CEQA transportation impact analyses and measures proposed to mitigate significant impacts. The CMA maintains a Countywide Transportation Model, and has approval authority for the use of any local or subarea transportation models.

The City of Oakland has responsibility for constructing and maintaining non-state or federal transportation facilities in the city.

City of Oakland General Plan. The Land Use and Transportation Element (LUTE) of the General Plan has numerous policies related to transportation issues. The primary LUTE policies relevant to transportation, circulation and parking include the following:

- Policy T2.4: Encourage transportation improvements that facilitate economic development.
- Policy T2.5: Link transportation facilities and infrastructure improvements to recreational uses, job centers, commercial nodes, and social services (i.e., hospitals, parks, or community centers).
- Policy T3.2: The City should promote and participate in both local and regional strategies to manage traffic supply and demand where unacceptable levels of service exist or are forecast to exist.
- Policy T3.3: For intersections within Downtown and for those that provide direct access to Downtown locations, the city should accept a lower level of service and a higher level of traffic congestion than is accepted in other parts of Oakland. The desired pedestrian-oriented nature of Downtown activity and the positive effect of traffic congestion in promoting the use of transit or other methods of travel should be recognized.
- Policy T3.5: The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realized streets, wherever possible.
- Policy T3.6: The City should encourage and promote use of public transit in Oakland by expediting the movement of and access to transit vehicles on designated "transit streets" as shown on the Transportation Plan. (Policies T3.6 and T3.7 are based on the City Council's passage of "Transit First" policy in October 1996.)
- Policy T3.7: The City, in constructing and maintaining its transportation infrastructure, should resolve any conflicts between public transit and single occupant vehicles in favor of transportation mode that has the potential to provide the greatest mobility and access for people, rather than vehicles, giving due consideration to the environmental, public safety, economic development, health and social equity impacts.
- Policy T4.1: The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.
- Policy T4.6: Alternative modes of transportation should be accessible for all of Oakland's population including the elderly, disabled, and disadvantaged.
- Policy T4.10: Take advantage of existing transportation infrastructure and capacity that is underutilized. For example, where possible and desirable, convert underused travel lanes to bicycle or pedestrian paths or amenities.
- Policy T6.2: The City should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches, and other support facilities.
- Policy T6.5: The City should protect and encourage enhancement of the distinctive character of scenic routes within the city, through prohibition of billboards, design review, and other means.

- Policy D13.1: A variety of transportation modes to and within all downtown districts should be coordinated to safety and efficiently move people and goods. Affordability and convenience are primary considerations.
- Policy D13.2: An adequate quantity of car, bicycle, and truck parking, which has been designed to enhance the pedestrian environment, should be provided to encourage housing development and the economic vitality of commercial, office, entertainment, and mixed use areas.

City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval (Standard Conditions of Approval) that would apply to the proposed project are listed below.

Condition 23: Construction Traffic and Parking. *Prior to issuance of a demolition, grading, or building permit.* The project applicant and construction contractor shall meet with appropriate City of Oakland agencies to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of this project and other nearby projects that could be simultaneously under construction. The project applicant shall develop a construction management plan for review and approval by the appropriate City of Oakland agencies. The plan shall include at least the following items and requirements:

a) A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes.
b) Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur.
c) Location of construction staging areas for materials, equipment, and vehicles (must be located on the project site).
d) A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. Planning and Zoning shall be informed who the Manager is prior to the issuance of the first permit issued by Building Services.
e) Provision for accommodation of pedestrian flow.

Major Project Cases:

f) Provision for parking management and spaces for all construction workers to ensure that construction workers do not park in on-street spaces.

b. Impacts and Mitigation Measures (Group 1). This section discusses potential impacts to transportation and circulation that could result from implementation of the Lake Merritt and Lake Merritt Channel group components. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with Measure DD and identifies mitigation measures, as appropriate.

(1) Criteria of Significance. Implementation of the Lake Merritt and Lake Merritt Channel group would have a significant impact on transportation if it would:

1) Cause an increase in traffic which is substantial in relation to the traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections), or change the condition of an existing street (i.e., street closures, changing direction of travel) in a manner that would substantially impact access or traffic load and capacity of the street system. Specifically,

a. at a study, signalized intersection which is located **outside the Downtown**[2] area, the project would cause the LOS[3] to degrade to worse than LOS D (i.e., LOS E);
b. at a study, signalized intersection which is located **within the Downtown** area, the project would cause the LOS to degrade to worse than LOS E (i.e., LOS F);
c. at a study, signalized intersection **outside the Downtown** area where the LOS is E, the project would cause the total intersection average vehicle delay to increase by four (4) or more seconds, or degrade to worse than LOS E (i.e., LOS F);
d. at a study, signalized intersection for **all areas** where the LOS is E, the project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more, or degrade to worse than LOS E (i.e., LOS F);
e. at a study, signalized intersection for **all areas** where the LOS is F, the project would cause: (a) the total intersection average vehicle delay to increase by two (2) or more seconds; or (b) an increase in average delay for any of the critical movements of four (4) seconds or more; or (c) the volume-to-capacity ("V/C") ratio exceeds three (3) percent (but only if the delay values cannot be measured accurately);
f. at a study, unsignalized intersection for **all areas**, the project would add ten (10) or more vehicles and after project completion satisfy the Caltrans peak hour volume warrant;
g. Cause a roadway segment on the Metropolitan Transportation System to operate at LOS F or increase the V/C ratio by more than three (3) percent for a roadway segment that would operate at LOS F without the project;
h. A project's contribution to cumulative impacts is considered "considerable" when the project contributes five (5) percent or more of the cumulative traffic increase as measured by the difference between existing and future cumulative (with project) conditions;

2) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
3) Substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature (e.g., sharp curves or dangerous intersections) that does not comply with Caltrans design standards or incompatible uses (e.g., farm equipment);
4) Result in less than two emergency access routes for streets exceeding 600 feet in length;
5) Fundamentally conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle routes); or
6) Generate added transit ridership that would
   a. Increase the average ridership on AC Transit lines by three (3) percent at bus stops where the average load factor with the project in place would exceed 125% over a peak thirty minute period;
   b. Increase the peak hour average ridership on BART by three (3) percent where the passenger volume would exceed the standing capacity of BART trains; or
   c. Increase the peak hour average ridership at a BART station by three (3) percent where average waiting time at fare gates would exceed one minute.

[2] Downtown is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south and I-980/Brush Street to the west.

[3] LOS and delay calculations for local intersections is based on the Highway Capacity Manual, Transportation Research Board, National Research Council, 2000 edition.

Criteria 2, 3 and 6 are not applicable to this analysis. Air traffic patterns and emergency access routes would not be affected by the component and transit ridership is not anticipated to change.

(2) Impacts and Mitigation Measures. The impacts and mitigation measures for the project with Variant A or B would be essentially the same for the operation of roadways, transit, and bicycle and pedestrian facilities. Variant B would differ from Variant A only by providing a two-way left-turn lane along the proposed two-lane section of Lakeshore Avenue. A two-way left-turn lane would function as a continuous southbound left-turn lane because there are no properties that would be served by northbound left-turning movements. The difference between Variants A and B is not measurable with the standard analytical methods used in this analysis but is discussed qualitatively.

Impacts to LOS. Intersection operations for Existing Conditions, and Existing plus Project, are summarized in Table IV.C-5. The difference between Variants A and B is not measurable with standard analytical methods; however, there are some driveways along Lakeshore Avenue that would be served by having the two-way left-turn lane provided by Variant B. The two-way left-turn lane would allow southbound vehicles turning into driveways to wait in the median for a gap in oncoming traffic without blocking southbound through traffic. The two-way left-turn lane would also provide a space for vehicles to bypass vehicles engaged in parallel parking maneuvers.

With the implementation of the project, the Lake Park Avenue/Lakeshore Avenue intersection would operate at LOS C during the Saturday peak hour with an average intersection delay 20.2 seconds.

Implementation of the Lake Merritt and Lake Merritt Channel project components would result in significant impacts at four intersections: Santa Clara Avenue/Grand Avenue; Lake Park Avenue/Lakeshore Avenue; MacArthur Boulevard/Lakeshore Avenue; and 27th Street/Bay Place/Harrison Street. Each intersection impacted by the Lake Merritt and Lake Merritt Channel project components is described below, along with recommended mitigation measures.

Impact TRANS-1 (Group 1): For Existing Conditions Plus the Project, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS E during the PM peak hour. (S)

Mitigation Measure TRANS-1: The City shall optimize the signal timing at the Santa Clara Avenue/Grand Avenue intersection to improve traffic operations during the PM peak hour. Signal optimization is expected to improve the intersection to LOS D. (LTS)

Impact TRANS-2 (Group 1): For Existing Conditions Plus the Project, the average vehicle delay at the Lake Park Avenue/Lakeshore Avenue intersection would increase by 38.6 seconds during the AM peak hour to a LOS F. (S)

Mitigation Measure TRANS-2: The City shall make the following modifications at the Lake Park Avenue/Lakeshore Avenue intersection to improve traffic operations:

1. Convert the center northbound lane on Lakeshore Avenue from a through movement to a left turning movement and provide split signal phasing for eastbound and westbound Lakeshore Avenue traffic movements; and
2. Optimize traffic signal timing.

Table IV.C-5: Intersection Levels of Service – Existing Conditions Plus Project

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing Conditions (No Project) LOS[a]	Existing Conditions (No Project) Delay[b]	Existing Conditions Plus Project LOS[a]	Existing Conditions Plus Project Delay[b]
1. Santa Clara Ave/Grand Ave	Signal	Signal	AM	E	61.6	D	45.1
			PM	D	46.4	E	66.0
2. MacArthur Blvd/Grand Ave	Signal	Signal	AM	C	26.0	C	24.5
			PM	C	29.2	C	32.7
3. El Embarcadero (WB)/ Grand Ave	Signal	Signal	AM	B	14.1	C	23.4
			PM	A	9.1	C	30.2
4. El Embarcadero (EB)/Grand Ave	Signal		AM	A	4.7	(Intersection Eliminated)	
			PM	C	21.7		
5. Lake Park Ave/Lakeshore Ave	Signal	Signal	AM	E	77.2	F	115.8
			PM	D	35.2	C	31.9
6. MacArthur Blvd/Lakeshore Ave	Signal	Signal	AM	D	36.0	C	34.0
			PM	F	89.3	F	103.1
7. El Embarcadero (WB)/Lakeshore Ave	Minor Stop	Signal	AM	N/A [c]		B	13.6
			PM			B	14.7
8. El Embarcadero (EB)/Lakeshore Ave	Minor Stop		AM	E	38.2	(Intersection Eliminated)	
			PM	F	180.2		
9. Boden Way/Lakeshore Ave	Minor Stop	Minor Stop	AM	C	23.0	C	19.5
			PM	B	13.9	C	15.7
10. Cleveland St/Lakeshore Ave	Ped Xing	Ped Xing	AM	A	2.1	A	2.5
			PM	A	2.2	A	2.7
11. Brooklyn Ave/Lakeshore Ave	Signal	Signal	AM	A	8.0	B	10.9
			PM	A	7.3	B	10.0
12. Wesley Ave/Lakeshore Ave	Minor Stop	Minor Stop	AM	C	15.1	C	18.9
			PM	C	24.5	C	21.3
13. Hanover Ave/Lakeshore Ave	Signal	Signal	AM	B	13.5	C	21.6
			PM	B	19.1	C	26.7
14. E. 18th St/Lakeshore Ave	Signal	Signal	AM	C	30.6	B	19.0
			PM	E	55.7	B	15.4
15. Foothill Blvd/Lakeshore Ave	Signal	Signal	AM	B	14.3	B	10.7
			PM	C	27.7	A	8.2
16. E. 16th St/1st Ave	Minor Stop	Minor Stop	AM	B	10.6	B	11.3
			PM	B	13.5	B	13.8
17. E. 15th St/1st Ave	Signal	Signal	AM	B	15.2	A	9.8
			PM	C	20.8	A	7.6
18. Int'l Blvd/1st Ave	Signal	Signal	AM	B	15.7	B	14.6
			PM	C	27.1	A	8.0
19. E. 12th St/1st Ave		Signal	AM	(Future Intersection)		B	15.3
			PM			B	11.7
20. Foothill Blvd/2nd Ave	Minor Stop	Minor Stop	AM	C	15.7	C	15.7
			PM	C	15.5	C	15.5
21. E. 15th St/2nd Ave	Minor Stop	Minor Stop	AM	B	12.7	B	12.7
			PM	C	18.3	C	18.3
22. Int'l Blvd/2nd Ave	Signal	Signal	AM	A	9.6	A	9.6
			PM	B	19.6	B	19.7
23. E. 12th St/2nd Ave	Signal	Signal	AM	B	16.4	A	9.1
			PM	B	17.0	B	16.9
24. E. 10th St/2nd Ave	Minor Stop	Minor Stop	AM	B	11.6	B	11.6
			PM	C	16.1	C	16.1
25. Foothill Blvd/5th Ave	Signal	Signal	AM	B	13.2	B	13.2
			PM	B	13.4	B	13.4

Table IV.C-5 *Continued*

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing Conditions (No Project) LOS[a]	Existing Conditions (No Project) Delay[b]	Existing Conditions Plus Project LOS[a]	Existing Conditions Plus Project Delay[b]
26. Int'l Blvd/5th Ave	Signal	Signal	AM	B	13.7	B	13.7
			PM	B	13.2	B	13.3
27. E. 12th St/5th Ave	Signal	Signal	AM	B	12.4	B	12.8
			PM	B	16.4	B	14.7
28. E. 8th St/5th Ave	Signal	Signal	AM	B	11.5	B	11.4
			PM	B	13.3	B	13.3
29. Embarcadero /5th Ave	Minor Stop	Minor Stop	AM	B	12.5	B	12.5
			PM	E	39.0	E	39.0
30. 27th St/Bay Pl/Harrison St	Signal	Signal	AM	F	146.3	F	150.9
			PM	C	31.8	C	31.8
31. Grand Ave/Harrison St [d]	Signal	Signal	AM	D	39.4	C	33.8
			PM	C	34.8	C	34.8
32. Harrison St/Lakeside Dr [d]	Signal	Signal	AM	A	9.1	B	19.1
			PM	B	13.0	C	22.4
33. 20th St/Harrison St [d]	Signal	Signal	AM	D	35.5	C	21.4
			PM	C	34.6	B	17.5
34. Jackson St/Lakeside Dr [d]	Signal	Signal	AM	A	7.2	B	11.3
			PM	A	8.9	B	18.2
35. Madison St/Lakeside Dr [d]	Signal	Signal	AM	A	6.4	A	6.9
			PM	B	11.1	B	10.6
36. 17th St/Madison St [d]	Signal	Signal	AM	B	12.9	A	7.3
			PM	B	13.6	A	7.7
37. 17th St/Lakeside Dr [d]	Minor Stop	Minor Stop	AM	B	11.8	B	12.8
			PM	B	11.6	B	13.3
38. 14th St/Madison St [d]	Signal	Signal	AM	B	15.0	B	12.5
			PM	B	14.8	B	14.3
39. 14th St/Lakeside Dr [d]	Signal	Signal	AM	B	13.6	B	12.2
			PM	B	10.9	B	10.5
40. 13th St/Madison St [d]	Signal	Signal	AM	B	10.5	B	10.3
			PM	B	12.0	B	11.8
41. 13th St/Oak St [d]	Signal	Signal	AM	B	17.7	B	16.9
			PM	B	16.5	B	15.3
42. 12th St/Madison St [d]	Signal	Signal	AM	A	5.3	A	5.4
			PM	A	8.5	A	8.4
43. 12th St/Oak St [d]	Signal	Signal	AM	B	13.7	B	16.2
			PM	B	13.5	B	14.0
44. 11th St/Madison St [d]	Signal	Signal	AM	B	12.0	B	12.1
			PM	B	12.1	B	12.4
45. 11th St/Oak St [d]	Minor Stop	Minor Stop	AM	B	10.9	B	10.9
			PM	B	11.1	B	11.1
46. 10th St/Madison St [d]	Signal	Signal	AM	A	5.3	A	5.3
			PM	A	4.5	A	4.5
47. 10th St/Oak St [d]	Signal	Signal	AM	A	8.8	A	8.8
			PM	A	9.7	A	9.7
48. 8th St/Madison St [d]	Signal	Signal	AM	A	9.2	A	9.3
			PM	A	8.5	A	8.6
49. 8th St/Oak St [d]	Signal	Signal	AM	B	17.1	B	17.1
			PM	B	16.1	B	16.1
50. 7th St/Madison St [d]	Signal	Signal	AM	B	16.8	B	16.8
			PM	B	16.2	B	16.2

Table IV.C-5 *Continued*

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing Conditions (No Project) LOS[a]	Existing Conditions (No Project) Delay[b]	Existing Conditions Plus Project LOS[a]	Existing Conditions Plus Project Delay[b]
51. 7th St/Oak St [d]	Signal	Signal	AM	B	13.5	B	13.5
			PM	B	13.3	B	13.3
52. Lakeshore Ave/1st Ave		Signal	AM	(Future Intersections)		A	1.6
			PM			A	1.4
53. 12th St/Convention Ctr [d]		Signal	AM			A	1.8
			PM			A	2.5
54. 11th-12th St/14th St [d]		Signal	AM			A	9.2
			PM			B	11.6
55. 13th St/14th St [d]		Signal	AM			A	9.2
			PM			B	11.5

Notes: Shaded values indicate a potential significant impact.
[a] LOS = Level of Service
[b] Average control delay in seconds per vehicle
[c] HCM LOS is not applicable for the stop-controlled approaches of this intersection.
[d] Defined as a downtown intersection
[e] The worst approach control delays and LOS are reported for side street stop-controlled intersections.
Source: Dowling Associates, 2007.

This mitigation measure would reduce the total intersection average vehicle delay by 51.6 seconds during the AM peak hour, although the intersection would remain at LOS E, as it is under the existing condition. After project mitigation, the intersection would operate at a total average vehicle delay that would be 13 seconds lower than the delay with no project and no mitigation. (LTS)

Impact TRANS-3 (Group 1): For Existing Conditions Plus the Project, the average vehicle delay at the MacArthur Boulevard/Lakeshore Avenue intersection would increase by 13.8 seconds during the PM peak hour where the LOS is rated F without the project. (S)

Mitigation Measure TRANS-3: The City shall make the following modifications at the MacArthur Boulevard/Lakeshore Avenue intersection to improve traffic operations:

1. Convert the combination left-through lane on eastbound MacArthur Boulevard to a through-only lane, resulting in one left-turn lane, two through lanes and one combination through-right turn lane;
2. Convert the center southbound lane on Lakeshore Avenue from a through movement to a combined through-left turning movement and provide split signal phasing for Lakeshore Avenue traffic movements; and
3. Optimize traffic signal timing.

This mitigation measure would reduce the total intersection average vehicle delay by 39.3 seconds during the PM peak hour, and the intersection would operate at LOS E. After project mitigation, the intersection would operate at a total average vehicle delay that would be 25.5 seconds lower than the delay with no project and no mitigation. (LTS)

Impact TRANS-4 (Group 1): For Existing Conditions Plus the Project, the average vehicle delay at the 27th Street/Bay Place/Harrison Street intersection would increase by 4.6 seconds during the AM peak hour where the LOS is rated F without the project. (S)

Mitigation Measure TRANS-4: The City shall optimize the signal timing at the 27th Street/Bay Place/Harrison Street intersection to reduce the total intersection average vehicle delay by 49.9 seconds during the AM peak hour. Although with mitigation the intersection would remain at LOS F, it would operate at a total average vehicle delay that would be 45.3 seconds lower than the delay with no project and no mitigation. (LTS)

Traffic Hazards. Implementation of the Lake Merritt and Lake Merritt Channel project components would reduce traffic hazards. One goal of this project group is to improve bicycle and pedestrian safety and circulation. Various elements of the project would improve safety for motor vehicles, pedestrians and bicycles. Some of the safety improvement elements are summarized below.

Lakeshore Avenue

1. The abandoned southeast portion of El Embarcadero would be converted into a multi-use path and promenade.
2. The sidewalk along the lake side of Lakeshore Avenue would be widened to include a 10-foot multi-use path.
3. 5-foot Class II bike lanes would be installed along both sides of the street.
4. Pedestrian crossings would be improved at:
   a. El Embarcadero – signals and marked crossings would be installed on all legs at Grand Avenue and Lakeshore Avenue.
   b. Boden Way – marked crossings would be installed on all legs and a pedestrian refuge island would be installed on the south leg.
   c. Cleveland Cascade – bulb-outs would be installed, crossing markings would be improved, and pedestrian refuge islands would be provided on the north and south legs.
   d. Brooklyn Avenue – a pedestrian refuge island would be installed on the south leg with in-line accessible ramps.
   e. Wesley Avenue – in-line accessible ramps would be installed.
   f. Hanover Avenue – in-line accessible ramps would be installed.

12th Street

1. 10-foot sidewalks and 6-foot bike lanes would be provided where practicable.
2. Signalized pedestrian crossings with refuge islands would be provided at numerous locations.

Lakeside Drive/Harrison Street/Oak Street

Class II bike lanes would be installed along Lakeside Drive and Harrison Street to/from Grand Avenue.

The narrower street widths and bulb-outs would shorten the crossing distance for pedestrians and create a narrowing effect that tends to slow vehicular traffic. Pedestrian refuge islands would provide safe shelters for pedestrians and allow them to take advantage of directional gaps in traffic. Signals

and marked crosswalks channel pedestrians to less hazardous crossing locations and increase motorists' awareness. In-line accessible ramps alert the visually-impaired of the correct direction to cross streets. Dedicated bike lanes reduce potential conflicts between vehicles and bicycles as well as between "commuter" bicyclists and "recreational" bicyclists who tend to use the multi-use path. These provisions would improve the safety of road users and would not increase traffic hazards. Therefore, the project impact is less-than-significant.

The bicycle and pedestrian connections along the Lake Merritt Channel between 7th Street and the Oakland Estuary have not been defined by the project. The current trail ends just south of the 7th Street Bridge. Bicycle and pedestrian access to the estuary is served by 7th Street and 5th Avenue. Although it would be desirable to improve bike and pedestrian accessibility along the channel, the alternative route provides wide outside lanes that adequately serve bicyclists and sidewalks to serve pedestrians. Therefore, the failure to improve the connections would not fundamentally conflict with adopted policies, plans, or programs supporting bicycle and pedestrian transportation.

The City has an interest in providing trail access along the Lake Merritt Channel south of 7th Street. To accomplish that goal, the City must cross the I-880 freeway right-of-way and Union Pacific mainline rail tracks. Caltrans is currently developing plans to replace the I-880 freeway elevated structure that crosses the channel. The City is working with Caltrans to determine the feasibility of providing a trail connection under the new freeway.

A grade separated crossing of the Union Pacific rail tracks may provide the most direct trail connection between Lake Merritt and the Oakland Estuary; however, there are several issues that must be resolved before such a crossing would become possible. The cost of constructing a grade separation would likely be high, and the close proximity of the I-880 freeway, which the trail would have to pass under, may require a circuitous passage over the Union Pacific tracks in order to satisfy the requirements of the Americans with Disabilities Act. A grade separated rail crossing may not be justified because its height and potentially circuitous route may deter pedestrians from using it and make its potential for use too low to justify the high cost. Other alternatives would include providing a connection to 5th Avenue, where bicyclists and pedestrians currently cross the tracks, or providing a new at-grade rail crossing along the channel. A new at-grade crossing would require the agreement of Union Pacific Railroad (UPRR) and the California Public Utilities Commission. The resolution of improving trail connectivity is not intended to be resolved in this study.

Travel Times. The City studied the 12th Street and Harrison Street corridors to understand how the project would affect traffic travel times in these areas, although the City does not have CEQA significance criteria for roadway delays because it believes that intersection analyses more accurately predict traffic impacts. Because traffic patterns change in response to traffic delays, the City believes that traffic impacts are better modeled by an intersection analysis for determining significance under CEQA. The travel time analysis was nevertheless performed to help understand how automobile, bus and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components.

The reconstruction of 12th Street would increase the travel time and decrease the speed of vehicles that use 12th Street, including existing AC Transit lines and future BRT vehicles. The reconstruction of 20th and Harrison Street would increase the travel time and decrease the speed of vehicles that use Harrison Street. Twelfth Street is designated as a local transit street and Harrison Street has no transit

street designation in the LUTE. Travel times and speeds along 12th Street and Harrison Street in areas that accommodate primary bus routes are summarized in Table IV.C-6 for Existing Conditions and Existing Conditions Plus Project. Detailed calculations are included in Appendix E.

Table IV.C-6: Travel Times and Speeds along 12th Street and Harrison Street – Existing Conditions Plus Project

Roadway	Approach	Peak Hour	Existing Conditions		Existing Conditions Plus Project	
			Travel Time (secs)	Average Speed (mph)	Travel Time (secs)	Average Speed (mph)
12th Street (Foothill Blvd to Madison)	EB	AM	84.9	12.4	157.5	6.6
		PM	114.9	9.2	199.0	5.2
	WB	AM	170.8	14.4	291.7	8.4
		PM	164.0	14.9	265.4	9.2
Harrison Street (Grand Avenue to 20th Street)	NB	AM	99.5	9.6	144.7	6.7
		PM	132.6	7.2	164.4	5.9
	SB	AM	133.6	7.5	130.2	7.7
		PM	136.1	7.4	134.0	7.5

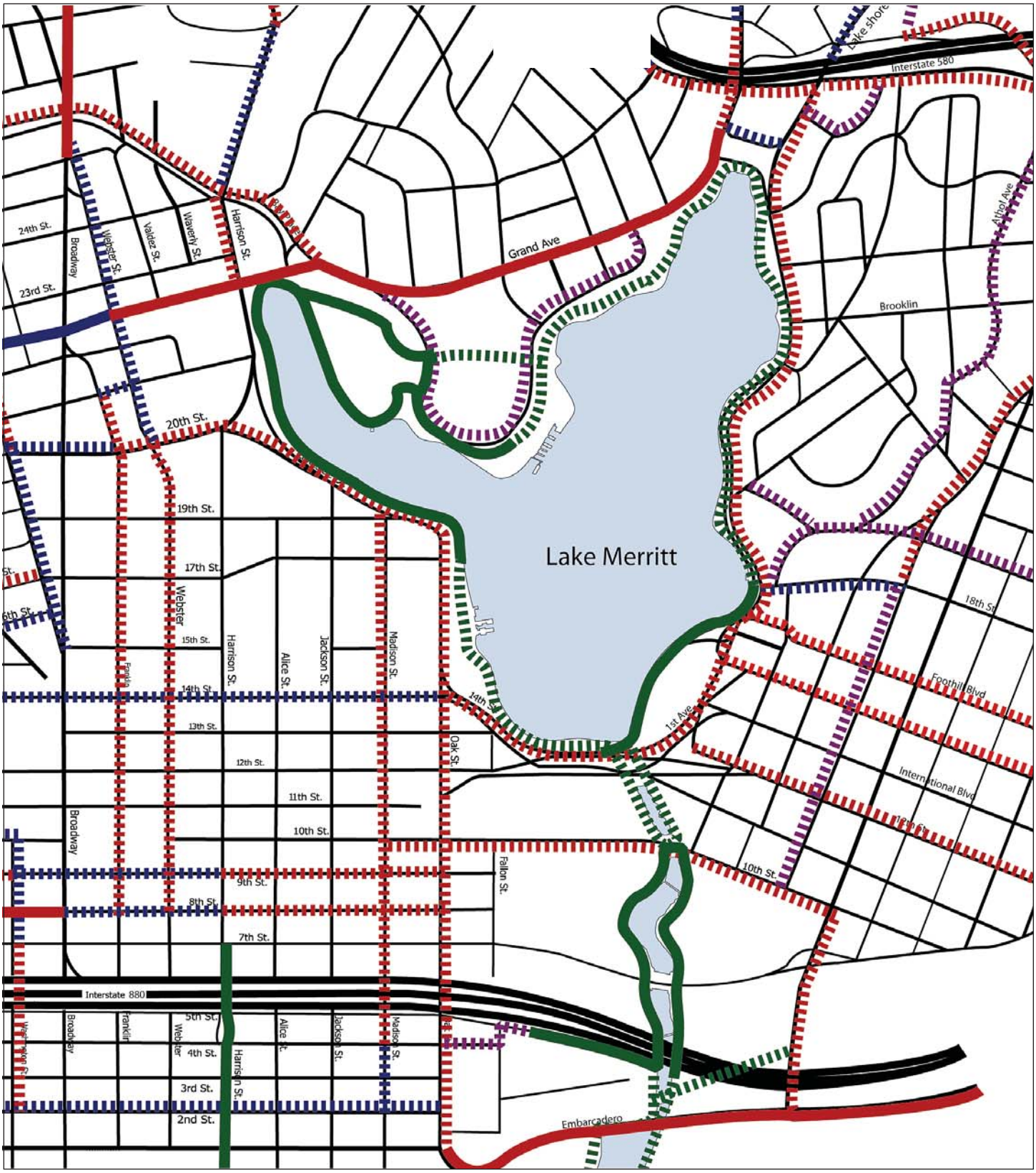
Source: Dowling Associates, 2007.

For Existing Conditions Plus the Project, eastbound travel times along 12th Street between Foothill Boulevard and Madison Avenue would increase by approximately 1.2 minutes during the AM peak hour and 1.4 minutes during the PM peak hour, and westbound travel times along 12th Street would increase by approximately 2.0 minutes during the AM peak hour and 1.7 minutes during the PM peak hour.

For Existing Conditions Plus the Project, northbound travel times along Harrison Street between Grand Avenue and 20th Street would increase by approximately 45 seconds during the AM peak hour and approximately 32 seconds during the PM peak hour.

Alternative Transportation (Pedestrian and Bicycle Transportation). The Lake Merritt and Lake Merritt Channel group would not conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation. The project is consistent with the adopted Oakland Bicycle Master Plan (see Figure IV.C-5 for the most recent update) and Pedestrian Master Plan. It would improve bikeway connectivity and pedestrian access around Lake Merritt and along the Lake Merritt Channel and would complete linkages along the Oakland waterfront.

Alternative Transportation (Transit Operations). The Lake Merritt and Lake Merritt Channel group would not fundamentally conflict with adopted policies, plans, or programs supporting transit use. The Measure DD Implementation Project may improve use of BART and AC Transit due to the improved pedestrian linkages in the area served by these transit operators. Although transit travel times would increase as a result of the project, as noted above, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Thus, the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use because bus traffic is affected no differently than automobiles or other street traffic. Therefore the project's impacts would not be considered significant under CEQA. Nevertheless, the City recognizes that there would be operational impacts on



LSA

LEGEND

EXISTING	PROPOSED	
		BIKE PATH (CLASS 1)
		BIKE LANE (CLASS 2)
		BIKE ROUTE (CLASS 3)
		ARTERIAL BIKE ROUTE (CLASS 3A)
		BIKE BOULEVARD (CLASS 3B)

N

NOT TO SCALE

FIGURE IV.C-5

Oakland Measure DD
Proposed Bikeway Network

SOURCE: CITY OF OAKLAND BICYCLE MASTER PLAN UPDATE, WILBUR-SMITH ASSOCIATES, FEBRUARY 2007.

I:\RAJ0606 measure dd\figures\EIR\Fig_IV.C5.ai (6/1/07)

AC Transit and would seek to find mutually agreeable solutions including implementation of the following recommendation to improve transit circulation.

Transit Recommendation:

- The City should provide transit signal priority to reduce travel times along 12th Street and Harrison Street. This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street.

Further steps that would be needed to eliminate travel time increases would likely require providing a bus-only lane in each direction along 12th Street and potentially queue jump lanes at intersections. Additional measures such as the elimination of pedestrian crosswalks might also be required.

Adding a bus-only lane in each direction along 12th Street would increase the street width from seven or eight lanes at various intersections to nine or ten lanes if acceptable levels of traffic operations are to be maintained. Conversion of general purpose lanes to transit only lanes would cause traffic operations to fall below acceptable levels.

Providing queue jump lanes would similarly require adding one or more lanes at intersections and may require longer pedestrian crossing distances. Eliminating one or more pedestrian crosswalks would run counter to achieving the objectives of the project, which include improvement of pedestrian and bicycle safety and circulation around Lake Merritt. The addition of lanes would also reduce the amount of new parkland created by the project.

While adding bus-only lanes or queue jump lanes, or eliminating pedestrian crosswalks are feasible, they are not recommended because they would have substantial impacts on traffic operations or pedestrian mobility, and in most cases have additional costs.

Cumulative (2025) Impacts and Mitigation Measures. The same methods of analysis as described above for the assessment of project-specific impacts were used for the analysis of transportation impacts of the project in combination with past, other current and probable near term projects scheduled to complete by Year 2025, including the BRT improvements. The applicable mitigation measures proposed by the following approved projects were also assumed to be in place by Year 2025:

- Oakland Whole Foods Market
- Jack London Square Redevelopment
- Oak to Ninth Avenue Project

Traffic forecasts were based on the 2006 version of the Alameda Countywide Model as required by the Alameda County CMA. The model provides forecasts of travel demand for 2010 and 2025 based on ABAG Projection 2002 socioeconomic forecasts. Two levels of analysis were performed for the analysis of cumulative traffic impacts using the Alameda Countywide Model. A CMP analysis was performed using the model with the ABAG land uses for 2010 and 2025. A summary of the CMP analysis is provided in Appendix E.

A more detailed analysis was conducted for the purposes of assessing cumulative environmental impacts to the transportation system and the extent to which the project would contribute to cumulative impacts. In the environmental analysis, a cumulative growth approach was developed for the City, using a forecast-based approach which is based on regional forecasts of economic activity and demographic trends. The updated cumulative growth scenario for the City considered recent and

anticipated future development projects in Oakland, as well as other changes in employment and population. Development projects and other changes in Oakland were identified based on input from City of Oakland and Port of Oakland staffs, and analysis of economic and real estate market data and trends. Future development projects were identified to include approved, proposed, and potential development projects expected by the year 2020, including buildout of the Oakland Army Base (OARB) redevelopment project area.

The 2020 employment and population data developed by the method described above were compared against 2025 employment and population in the ABAG land use dataset, and the former exceeded the latter within the City. The ABAG land use data for the City of Oakland were replaced in the ABAG 2025 land use data set and used as the basis for the analysis of cumulative conditions, because this scenario was deemed to be a worst case scenario under CEQA.

The Alameda Countywide Model was used with the land use data developed for the City to determine the traffic volumes that would be presented with the project in combination with past, other current, and probable future projects.

This environmental impact analysis yielded more conservative results than the CMP analysis, which is an assessment of greater cumulative impacts.

Roadways. Intersection operations for Cumulative Conditions under Existing and Cumulative plus Project Conditions are summarized in Table IV.C-7. The differences between the project with either Variants A or B are not measurable with standard analytical methods; however, as noted previously, there are some driveways along Lakeshore Avenue that would be served by having the continuous left-turn lane provided by Variant B. The continuous left-turn lane would allow southbound vehicles turning into driveways to wait in the median for a gap in oncoming traffic without blocking southbound through traffic. The continuous left-turn lane would also provide a space for vehicles to bypass vehicles engaged in parking maneuvers.

With the implementation of the project, the Lake Park Avenue/Lakeshore Avenue intersection would operate at LOS D during the Saturday peak hour with an average delay of 47.8 seconds.

Some intersections degrade under cumulative conditions due primarily to other projects that would be constructed in the future. If the Measure DD Implementation Project contributes less than 5 percent of the cumulative traffic increase at an intersection as measured by the difference between existing and future cumulative (with project conditions) the impact is considered less than significant. The impacts at the following four intersections were found to be less than significant for this reason:

- MacArthur Boulevard/Lakeshore Avenue
- Embarcadero/5th Avenue
- 27th Street/Bay Place/Harrison Street
- Grand Avenue/Harrison Street

Implementation of the Lake Merritt and Lake Merritt Channel group components, in combination with past, other current, and probable future projects, would result in significant impacts at five intersections, of which, the project would have a significant and unavoidable impact at three intersections. Each of the intersections impacted in 2025 by the Lake Merritt and Lake Merritt Channel group is described below, along with the recommend mitigation measures.

Table IV.C-7: Intersection Levels of Service – Cumulative (2025) Conditions

Intersection	Traffic Control		Peak Hour	Existing		Cumulative Plus Project	
	(Existing)	(Future)		LOS[a]	Delay[b]	LOS[a]	Delay[b]
1. Santa Clara Ave/Grand Ave	Signal	Signal	AM	E	61.6	E	63.3
			PM	D	46.4	F	80.0
2. MacArthur Blvd/Grand Ave	Signal	Signal	AM	C	26.0	C	27.4
			PM	C	29.2	F	120.2
3. El Embarcadero (WB)/Grand Ave	Signal	Signal	AM	B	14.1	C	25.3
			PM	A	9.1	D	47.0
4. El Embarcadero (EB)/Grand Ave	Signal		AM	A	4.7	(Intersection Eliminated)	
			PM	C	21.7		
5. Lake Park Ave/Lakeshore Ave	Signal	Signal	AM	E	77.2	F	180.2
			PM	D	35.2	D	50.4
6. MacArthur Blvd/Lakeshore Ave [f]	Signal	Signal	AM	D	36.0	E	68.7
			PM	F	89.3	F	225.7
7. El Embarcadero (WB)/Lakeshore Ave	Minor Stop	Signal	AM	N/A [c]		B	16.6
			PM			B	15.1
8. El Embarcadero (EB)/Lakeshore Ave	Minor Stop		AM	E	38.2	(Intersection Eliminated)	
			PM	F	180.2		
9. Boden Way/Lakeshore Ave	Minor Stop	Minor Stop	AM	C	23.0	C	18.9
			PM	B	13.9	C	15.3
10. Cleveland St/Lakeshore Ave	Ped Xing	Ped Xing	AM	A	2.1	A	2.8
			PM	A	2.2	A	2.8
11. Brooklyn Ave/Lakeshore Ave	Signal	Signal	AM	A	8.0	B	10.4
			PM	A	7.3	B	10.6
12. Wesley Ave/Lakeshore Ave	Minor Stop	Minor Stop	AM	C	15.1	C	17.4
			PM	C	24.5	C	20.7
13. Hanover Ave/Lakeshore Ave	Signal	Signal	AM	B	13.5	C	23.5
			PM	B	19.1	C	28.1
14. E. 18th St/Lakeshore Ave	Signal	Signal	AM	C	30.6	C	23.3
			PM	E	55.7	B	15.1
15. Foothill Blvd/Lakeshore Ave	Signal	Signal	AM	B	14.3	B	18.1
			PM	C	27.7	A	5.7
16. E. 16th St/1st Ave	Minor Stop	Minor Stop	AM	B	10.6	B	11.5
			PM	B	13.5	B	13.2
17. E. 15th St/1st Ave	Signal	Signal	AM	B	15.2	B	10.5
			PM	C	20.8	A	8.5
18. Int'l Blvd/1st Ave	Signal	Signal	AM	B	15.7	C	21.3
			PM	C	27.1	A	9.6
19. E. 12th St/1st Ave		Signal	AM	(Future Intersection)		D	42.6
			PM			B	18.2
20. Foothill Blvd/2nd Ave	Minor Stop	Minor Stop	AM	C	15.7	C	18.0
			PM	C	15.5	C	15.6
21. E. 15th St/2nd Ave	Minor Stop	Minor Stop	AM	B	12.7	B	12.9
			PM	C	18.3	D	34.3
22. Int'l Blvd/2nd Ave	Signal	Signal	AM	A	9.6	A	8.5
			PM	B	19.6	C	26.2
23. E. 12th St/2nd Ave	Signal	Signal	AM	B	16.4	B	12.3
			PM	B	17.0	B	18.0
24. E. 10th St/2nd Ave	Minor Stop	Minor Stop	AM	B	11.6	C	17.5
			PM	C	16.1	C	22.5
25. Foothill Blvd/5th Ave	Signal	Signal	AM	B	13.2	B	17.5
			PM	B	13.4	B	15.1

Table IV.C-7 *Continued*

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing LOS[a]	Existing Delay[b]	Cumulative Plus Project LOS[a]	Cumulative Plus Project Delay[b]
26. Int'l Blvd/5th Ave	Signal	Signal	AM	B	13.7	B	16.3
			PM	B	13.2	B	16.3
27. E. 12th St/5th Ave	Signal	Signal	AM	B	12.4	D	42.2
			PM	B	16.4	D	37.2
28. E. 8th St/5th Ave	Signal	Signal	AM	B	11.5	B	17.0
			PM	B	13.3	C	22.7
29. Embarcadero /5th Ave [f]	Minor Stop	Minor Stop	AM	B	12.5	C	30.7
			PM	E	39.0	F	214.7
30. 27th St/Bay Pl/Harrison St [f]	Signal	Signal	AM	F	146.3	F	117.1
			PM	C	31.8	F	155.7
31. Grand Ave/Harrison St [d, f]	Signal	Signal	AM	D	39.4	D	54.4
			PM	C	34.8	E	64.5
32. Harrison St/Lakeside Dr [d]	Signal	Signal	AM	A	9.1	C	23.3
			PM	B	13.0	C	25.3
33. 20th St/Harrison St [d]	Signal	Signal	AM	D	35.5	C	25.2
			PM	C	34.6	C	22.5
34. Jackson St/Lakeside Dr [d]	Signal	Signal	AM	A	7.2	B	19.3
			PM	A	8.9	B	18.8
35. Madison St/Lakeside Dr [d]	Signal	Signal	AM	A	6.4	A	9.0
			PM	B	11.1	D	42.6
36. 17th St/Madison St [d]	Signal	Signal	AM	B	12.9	B	13.8
			PM	B	13.6	B	15.3
37. 17th St/Lakeside Dr [d]	Minor Stop	Minor Stop	AM	B	11.8	C	15.7
			PM	B	11.6	B	13.9
38. 14th St/Madison St [d]	Signal	Signal	AM	B	15.0	B	19.8
			PM	B	14.8	B	19.0
39. 14th St/Lakeside Dr [d]	Signal	Signal	AM	B	13.6	B	17.0
			PM	B	10.9	B	12.8
40. 13th St/Madison St [d]	Signal	Signal	AM	B	10.5	B	10.5
			PM	B	12.0	B	11.4
41. 13th St/Oak St [d]	Signal	Signal	AM	B	17.7	B	18.2
			PM	B	16.5	B	15.9
42. 12th St/Madison St [d]	Signal	Signal	AM	A	5.3	A	6.8
			PM	A	8.5	A	9.6
43. 12th St/Oak St [d]	Signal	Signal	AM	B	13.7	D	40.7
			PM	B	13.5	B	15.1
44. 11th St/Madison St [d]	Signal	Signal	AM	B	12.0	B	12.8
			PM	B	12.1	B	15.0
45. 11th St/Oak St [d]	Minor Stop	Minor Stop	AM	B	10.9	B	10.9
			PM	B	11.1	B	11.1
46. 10th St/Madison St [d]	Signal	Signal	AM	A	5.3	A	8.1
			PM	A	4.5	A	5.7
47. 10th St/Oak St [d]	Signal	Signal	AM	A	8.8	F	138.4
			PM	A	9.7	B	16.6
48. 8th St/Madison St [d]	Signal	Signal	AM	A	9.2	B	13.5
			PM	A	8.5	A	9.5
49. 8th St/Oak St [d]	Signal	Signal	AM	B	17.1	B	15.9
			PM	B	16.1	B	15.3
50. 7th St/Madison St [d]	Signal	Signal	AM	B	16.8	C	32.8
			PM	B	16.2	B	18.5
51. 7th St/Oak St [d]	Signal	Signal	AM	B	13.5	B	16.0
			PM	B	13.3	F	100.9

Table IV.C-7 *Continued*

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing LOS[a]	Existing Delay[b]	Cumulative Plus Project LOS[a]	Cumulative Plus Project Delay[b]
52. Lakeshore Ave/1st Ave		Signal	AM	(Future Intersections)		A	2.3
			PM			A	1.9
53. 12th St/Convention Ctr [d]		Signal	AM			A	3.0
			PM			A	4.5
54. 11th-12th St/14th St [d]		Signal	AM			B	10.6
			PM			C	28.2
55. 13th St/14th St [d]		Signal	AM			A	8.8
			PM			B	17.1

Notes:
Shaded values indicate a potential significant impact.
[a] LOS = Level of Service
[b] Average control delay in seconds per vehicle
[c] HCM LOS is not applicable for the stop-controlled approaches of this intersection.
[d] Defined as a downtown intersection
[e] The worst approach control delays and LOS are reported for side street stop-controlled intersections.
[f] Although the LOS deteriorates in the cumulative condition, the project contributes less than 5 percent of the cumulative traffic increases and this the impact is less than significant.
Source: Dowling and Associates, 2007.

Impact TRANS-5 (Group 1): Under Cumulative Plus Project Conditions, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-5: Implementation of Mitigation Measure TRANS-1 would optimize the signal timing at the Santa Clara Avenue/Grand Avenue intersection and improve traffic operations to LOS E (73.9 seconds average delay) during the PM peak hour for the project under cumulative conditions. No other feasible mitigation measures were identified at this intersection as further improvements would entail widening of the roadway and require acquisition of right of way. Widening would also have adverse impact on the pedestrian environment at this heavily used intersection. After mitigation, the cumulative impact would remain significant and unavoidable. (SU)

Impact TRANS-6 (Group 1): Under the Cumulative Plus Project Conditions, the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-6: The City shall make the following modifications at the MacArthur Boulevard/Grand Avenue to improve traffic operations:

1. Convert the center southbound lane on Grand Avenue from a through movement to a combined through-left turning movement and provide split phasing for northbound and southbound Grand Avenue traffic movements; and
2. Optimize traffic signal timing for both AM and PM peak periods.

The modifications at the MacArthur Boulevard/Grand Avenue intersection described above would reduce the delay from 120.2 seconds to 81.7 seconds under the Cumulative Plus Project Conditions, but the intersection would remain at LOS F during the PM peak hour. No other feasible mitigation measures were identified at this intersection as further improvements

would entail widening of the roadway and require acquisition of right of way. Widening would also have adverse consequence for pedestrians. After mitigation, the cumulative impact of would remain significant and unavoidable. (SU)

Impact TRANS-7 (Group 1): Under the Cumulative Plus Project Conditions, the Lake Park Avenue/Lakeshore Avenue intersection would degrade to LOS F during the AM peak hour. (S)

Mitigation Measure TRANS-7: The City shall implement Mitigation Measure TRANS-2 and make the following modifications at the Lake Park Avenue/Lakeshore Avenue intersection to improve traffic operations:

1. Add a left-turn lane from the freeway off-ramp on the westbound Lake Park Avenue approach to the intersection; and
2. Optimize traffic signal timing.

The modification at the Lake Park Avenue/Lakeshore Avenue intersection described above would reduce the total intersection average vehicle delay by 115.3 seconds during the AM peak hour, although the intersection would operate at LOS E. After the project mitigation, the intersection would operate at a total average vehicle delay that would be 12.3 seconds lower than the delay under existing conditions with no project and no mitigation. Implementation of this mitigation measure would reduce the impact to a less-than-significant level. However, the City's ability to add the left-turn lane from the freeway ramp depends upon acquisition of right-of-way and an encroachment permit from Caltrans. Because the City cannot guarantee Caltrans' approval, the City is taking the conservative approach of considering this impact significant and unavoidable until sufficient right-of-way can be acquired and Caltrans approves an encroachment permit. (SU)

Impact TRANS-8 (Group 1): Under the Cumulative Plus Project Conditions, the 10th Street/Oak Street intersection would degrade to LOS F during the AM peak hour. (S)

Mitigation Measure TRANS-8: The City shall optimize the signal timing (modify the phase splits) at the 10th Street/Oak Street intersection to improve traffic operations. Implementation of the recommended mitigation would improve the intersection to LOS D during the AM peak hour. (LTS)

Impact TRANS-9 (Group 1): Under the Cumulative Plus Project Conditions, the 7th Street/Oak Street intersection would degrade to LOS F during the PM peak hour (S)

Mitigation Measure TRANS-9: The City shall optimize the signal timing (modify the phase splits) at the 7th Street/Oak Street intersection to improve traffic operations. Implementation of the recommended mitigation would improve the intersection to LOS D during the PM peak hour. (LTS)

Travel Time. As noted previously, the City studied the 12th Street and Harrison Street corridors to understand how the project would affect traffic travel times in these areas, although the City does not have CEQA significance criteria for roadway delays. Travel times and speeds along 12th Street and Harrison Street in 2025 are summarized in Table IV.C-8 for Cumulative and Cumulative plus Project Conditions. Detailed calculations are included Appendix E.

Table IV.C-8: Travel Times and Speeds along 12th Street and Harrison Street – Cumulative (2025) Conditions

Roadway	Approach	Peak Hour	Existing No Project		Cumulative Plus Project Conditions	
			Travel Time (secs)	Average Speed (mph)	Travel Time (secs)	Average Speed (mph)
12th Street(Foothill Blvd to Madison)	EB	AM	84.9	12.4	161.2	6.5
		PM	114.9	9.2	270	3.9
	WB	AM	170.8	14.4	364.4	6.7
		PM	164.0	14.9	273.1	9.0
Harrison Street (Grand Avenue to 20th Street)	NB	AM	99.5	9.6	157.5	6.2
		PM	132.6	7.2	218.6	4.4
	SB	AM	133.6	7.5	164.7	6.1
		PM	136.1	7.4	140.1	7.2

Source: Dowling Associates, 2007.

Under the Cumulative Plus Project Conditions, eastbound travel times would increase along 12th Street by approximately 1.3 minutes during the AM peak hour and 2.6 minutes during the PM peak hour, and westbound travel times would increase along 12th Street by approximately 3.2 minutes during the AM peak hour and 1.8 minutes during the PM peak hour.

Under the Cumulative Plus Project Conditions, northbound travel times would increase along Harrison Street by approximately 1 minute during the AM peak hour and approximately 1.4 minutes during the PM peak hour.

Alternative Transportation (Pedestrian and Bicycle Transportation). The Lake Merritt and Lake Merritt Channel group would not conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation and would not have a significant impact under the 2025 scenario. The project is consistent with the adopted Oakland Bicycle Master Plan (see Figure IV.C-5 for the most recent update) and Pedestrian Master Plan. It would improve bikeway connectivity and pedestrian access around Lake Merritt and along the Lake Merritt Channel and would complete linkages along the Oakland waterfront.

Alternative Transportation (Transit Operations). The Lake Merritt and Lake Merritt Channel group would not fundamentally conflict with adopted policies, plans, or programs supporting transit use. Although transit travel times would increase as a result of the project under the 2025 scenario, as noted above, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Nevertheless, the City recognizes that there would be operational impacts on AC Transit and would seek to find mutually agreeable solutions including implementation of the following recommendation to improve transit circulation:

Recommendations

- Implementation of transit signal priority as described in the previous recommendations for transit service would reduce delays for AC Transit. Nevertheless, the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and

Harrison Street. While adding bus-only lanes or queue jump lanes, or eliminating pedestrian crosswalks are feasible, they are not recommended because they would have substantial impacts on traffic operations or pedestrian mobility, and in most cases have additional costs.

2. Oakland Waterfront Trail and Access (Group 2)

The Oakland Waterfront Trail component aims to close gaps along the San Francisco Bay Trail between Jack London Square and 66th Avenue in East Oakland. These components are not expected to change automobile travel demand but would require the assessment of potential impacts to transportation systems where the trail may cross existing streets. Bridge crossings beneath the existing bridges are proposed to continue the trail along the Oakland Estuary. Such bridge crossings would not conflict with the existing transportation network.

a. Setting (Group 2). This section discusses the methods used for analyzing transportation systems, applicable regulations, and the existing site conditions for the Oakland Waterfront Trail improvements of the Measure DD Implementation Project.

(1) Methods. To determine the potential impacts of the Oakland Waterfront Trail group may have on trail users and vehicle safety, the vehicular traffic volumes and design features at three specified locations were evaluated.

(2) Existing Conditions. The existing facilities including bicycle and pedestrian access at the three locations are presented in this section.

Park Street Bridge (29th Avenue). Park Street Triangle is a triangular-shaped block located at the Oakland side of the Park Street Bridge, which links the City of Oakland with the City of Alameda. The triangle is bounded by a two-lane one-way westbound portion of Ford Street to the north, a three-lane one-way southbound portion of 23rd Avenue to the west and a two-lane one-way northbound portion of 29th Avenue to the east. A railroad track cuts through the triangle just north of the Park Street Bridge. The at-grade railroad crossing is uncontrolled and un-gated but has warning signs and pavement markings.

The existing street network is confusing to motorists and the 23rd Avenue alignment has a sharp bend on its approach to the Park Street Bridge that causes motorists to drift into an adjacent lane. While sidewalks in the area are prevalent, there are no marked crosswalks at the triangle. Bike lanes from the Embarcadero extend to 23rd Avenue and terminate at the southern tip of the triangle where bicyclists are instructed to dismount before crossing the Park Street Bridge.

The Park Street Triangle area is the subject of the *Park Street Triangle Traffic Study* prepared for the City of Oakland under MTC's Traffic Engineering Technical Assistance Program (TETAP) by Dowling Associates (August 2006). The existing conditions and safety concerns are discussed in detail in that report.

Fruitvale Avenue. The Waterfront Trail crosses Fruitvale Avenue at its intersection with Alameda Avenue. This T-intersection is signal-controlled with marked crosswalks on the north and east legs. Fruitvale Avenue and Alameda Avenue are both four-lane streets. The Fruitvale Avenue Bridge, located just south of the intersection, offers vehicular connection to Alameda. Consequently, left turning movements are permitted from both westbound lanes in order to facilitate traffic

movements onto the bridge. A parallel rail bridge is located west of the automobile bridge. Class II bike lanes extend from E. 12th Street to the Estuary along Fruitvale Avenue.

High Street. About half way between Fruitvale Avenue and High Street, a 540-foot eastwardly trail extends to High Street. Unlike Fruitvale Avenue, no direct crossing exists at High Street. Tidewater Avenue, an unsignalized intersection, is located about 150 feet to the north and provides a marked crossing on the south leg. High Street is a four-lane roadway that also provides connection to the City of Alameda via the High Street Bridge. Class III bike route runs along High Street from near Jenson Street south to Tidewater Avenue.

(3) Regulatory Context. Applicable laws and regulations pertaining transportation and circulation are the same as previously described for the Lake Merritt and Lake Merritt Channel group with the following additional policies in the LUTE of the General Plan that are specific to the Oakland waterfront:

- Policy T6.3: The waterfront should be made accessible to pedestrians and bicyclists throughout Oakland.
- Policy W2.3: Public access improvements to the waterfront and along the water's edge should be implemented as projects are developed. The access improvement should conform to the requirements of the Bay Conservation and Development Commission (BCDC).
- Policy W2.6: Safe access to areas for viewing maritime and aviation activities without interfering with seaport and airport activities should be encouraged.
- Policy W2.9: Parking should be developed at key points generally set back from the waterfront to minimize the impact of private automobile use in high-activity areas. Parking structures that incorporate ground floor uses, are available for day and night activities, and allow for shared use, are preferred.
- Policy W2.7: Public transportation to the waterfront should be encouraged, coordinated, and strategically located. Waterfront transportation should be marketed to enhance ease of access both locally and regionally.

b. Impacts and Mitigation Measures (Group 2). This section discusses potential impacts to transportation and circulation that could result from implementation of the Waterfront Trail project components. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts and identifies mitigation measures, as appropriate.

(1) Criteria of Significance. Two Criteria of Significance are applicable to the Waterfront Trail group. Implementation of this group of project components would have a significant impact on transportation if it would**:**

1. Substantially increase traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature (e.g., sharp curves or dangerous intersections) that does not comply with Caltrans design standards or incompatible uses (e.g., farm equipment); or
2. Fundamentally conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle routes).

(2) Impacts and Mitigation Measures. Impacts associated with the Waterfront Trail components are described below.

Traffic Hazards. Implementation of the proposed project would result in the Bay Trail passing under the bridges. Therefore, the project would not result in any significant impacts related to traffic hazards as the trail would not conflict with vehicular circulation.

Alternative Transportation. Implementation of the Waterfront Trail components would not conflict with adopted policies, plans and programs supporting alternative transportation. Implementation of the project component would enhance connectivity of bikeways and improve pedestrian facilities, thereby supporting alternative transportation.

3. Recreational Facilities (Group 3)

The Recreational Facilities group encompasses two elements, renovation of Studio One in North Oakland and construction of an East Oakland Sports Complex. Renovation of the North Oakland facility is already underway and is expected to have minimal transportation impact. This analysis focuses on the potential impacts resulting from the East Oakland Sports Complex.

a. Setting (Group 3). This setting discusses the methods used for analyzing transportation systems, applicable regulations and the existing site conditions for the Recreational Facilities group of the project.

(1) Methods. To determine the potential impacts of the East Oakland Sports Complex component, the LOS on roadways that would most likely be impacted by the development were evaluated at a program level for the environmental assessment. The traffic generated by the East Oakland Sports Complex was evaluated using the procedures required for compliance with the Alameda County CMP. This CMP analysis focuses on roadway links on the Metropolitan Transportation System and CMP street and highway segments and transit corridors, and does not extend to intersections.

The CMP analysis is accomplished by estimating the number of daily vehicle trips that would be generated by the complex, distributing the trips, and forecasting future volumes. The trip estimation was based on information in *Trip Generation*, 7th edition (Institute of Transportation Engineers, 2003). Traffic forecasts were based on the 2006 version of the Alameda Countywide Model as required by the Alameda County CMA. The model provides forecasts of travel demand for Year 2025 cumulative conditions based on ABAG Projection 2002 socioeconomic forecasts. Trips were distributed in accordance to distributing patterns from the model.

(2) Existing Conditions. Edes Avenue is the northern boundary of Ira Jenkins Park, where the East Oakland Sports Complex is located. It spans between Bergedo Drive in a residential neighborhood and Hegenberger Road, where it continues as Coliseum Way. Near Hegenberger Road, it provides access to and from northbound I-880. Edes Avenue has two travel lanes with parking on both sides of the street. Sidewalks are found around the perimeter of the park and marked crosswalks are available at the Edes Avenue and Jones Avenue intersection at the northeast corner of the park. No bicycle facility is provided in the immediate vicinity.

(3) Regulatory Context. Applicable laws and regulations pertaining transportation and circulation are the same as previously described for the Lake Merritt and Lake Merritt Channel group.

b. Impacts and Mitigation Measures (Group 3). This section discusses potential impacts to transportation and circulation that could result from implementation of the East Oakland Sports Complex component. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts and identifies mitigation measures, as appropriate.

(1) Criteria of Significance. Implementation of the Measure DD Implementation Project would have a significant impact on transportation if it would:

1. Cause a roadway segment on the Metropolitan Transportation System to operate at LOS F or increase the V/C ratio by more than three (3) percent for a roadway segment that would operate at LOS F without the project;

(2) Trip Generation. Trip generation for the East Oakland Sports Complex is based upon information in *Trip Generation, 7th Edition* (Institute of Transportation Engineers 2003). Trip generations for this component are shown in Table IV.C-9.

(3) Impacts and Mitigation Measures. The analysis of impacts was performed at a program level using the methods appropriate for a CMP analysis. The CMP analysis is provided in Appendix E. The findings of this analysis are that the East Oakland Sports Complex would not cause significant impacts to roadway or transit operations in 2010 or 2025. I-880 would be congested in both years, operating at LOS F during the peak hour; however, the East Oakland Sports Complex would add less than 3 percent of the traffic to those facilities. Other roadways, where the East Oakland Sports Complex would add significant traffic, would have the capacity to accommodate the additional traffic and still operate at LOS D or better. Transit ridership on BART and AC Transit would increase by 3 percent or less and would not result in significant impacts to transit service or require any frequency changes in service. The impacts of the East Oakland Sports Complex would be less than significant.

Table IV.C-9: Trip Generation for East Oakland Recreation Facility

Land Use	Source	Amount		Trips Generated								
				AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
				In	Out	Total	In	Out	Total	In	Out	Total
Proposed Project												
Recreational Community Center	ITE (459)	150	KSF	148	95	243	71	175	246	94	98	192

Source: Dowling Associates, 2007.
Notes: Average trip generation rates are from *Trip Generation, 7th Edition,* Institute of Transportation Engineers, 2003.

D. AIR QUALITY

This section describes the existing air quality setting for the Measure DD Implementation Project and has been prepared using methodologies and assumptions recommended in the air quality impact assessment guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, this chapter describes existing air quality, impacts of future traffic on local carbon monoxide levels, and impacts of land use-related vehicular emissions that have regional effects. Mitigation measures to reduce or eliminate potentially significant air quality impacts are identified, where appropriate.

1. Setting

The following discussion provides an overview of existing air quality conditions in the region and the Oakland area. Ambient standards and the regulatory framework relating to air quality are summarized. Climate, air quality conditions, and typical air pollutant types and sources are described.

a. Air Quality Standards, Regulatory Framework, Air Quality and Criteria Pollutants. Air quality standards, the regulatory framework, and State and federal attainment status are discussed below.

(1) Air Quality Standards. Both the State and federal governments have established health-based Ambient Air Quality Standards for six air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride and visibility-reducing particles. These standards are designed to protect public health and welfare with a reasonable margin of safety.

In addition to primary and secondary Ambient Air Quality Standards, the State of California has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase.

California Ambient Air Quality Standards and National Ambient Air Quality Standards for the criteria air pollutants are listed in Table IV.D-1. Health effects of these criteria pollutants are described in Table IV.D-2.

Table IV.D-1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.08 ppm	0.07 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.05 ppm	0.03 ppm
	1-Hour	–	0.18 ppm
Sulfur Dioxide	Annual	0.03 ppm	–
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	–	0.25 ppm
PM_{10}	Annual	-	20 µg/m3
	24-Hour	150 µg/m^3	50 µg/m3
$PM_{2.5}$	Annual	15 µg/m^3	12 µg/m3
	24-Hour	35 µg/m^3	–

Notes: ppm = parts per million
µg/m^3 = micrograms per cubic meter

Source: California Air Resources Board, 2007, *Ambient Air Quality Standards*.

[1] Bay Area Air Quality Management District, 1999. *BAAQMD CEQA Guidelines.*

Table IV.D-2: Health Effects of Air Pollutants

Pollutant	Health Effects	Examples of Sources
Particulate Matter ($PM_{2.5}$ and PM_{10})	• Increased respiratory disease • Lung damage • Premature death	• Cars and trucks, especially diesels • Fireplaces, wood stoves • Windblown dust from roadways, agriculture, and construction
Ozone (O_3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon Monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Nitrogen Dioxide (NO_2)	• Lung damage	• See carbon monoxide sources
Toxic Air Contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: CARB 2006.

(2) Overall Regulatory Setting. The Federal Clean Air Act governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the federal level, the United States Environmental Protection Agency (EPA) administers the Clean Air Act (CAA). The California Clean Air Act is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level.

Federal Clean Air Act. The 1970 Federal Clean Air Act authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The Federal Clean Air Act Amendments of 1990 changed deadlines for attaining national standards as well as the remedial actions required of areas of the nation that exceed the standards. Under the Clean Air Act, State and local agencies in areas that exceed the national standards are required to develop State Implementation Plans to demonstrate how they will achieve the national standards for O_3 by specified dates. The Clean Air Act requires that projects receiving federal funds demonstrate conformity to the approved State Implementation Plan and local air quality attainment plan for the region. Conformity with the State Implementation Plan requirements also satisfies the Clean Air Act requirements.

California Clean Air Act. In 1988, the California Clean Air Act required that all air districts in the State endeavor to achieve and maintain California Ambient Air Quality Standards for CO, O_3, SO_2 and NO_2 by the earliest practical date. The California Clean Air Act provides districts with new authority to regulate indirect sources and mandates that air quality districts focus particular attention on reducing emissions from transportation and area-wide emission sources. Each district plan is to achieve a 5 percent annual reduction, averaged over consecutive three-year periods, in district-wide emissions of each nonattainment pollutant or its precursors. Additional physical or economic development within the region would tend to impede the emissions reduction goals of the California

Clean Air Act. Generally, the State standards for these pollutants are more stringent than the national standards.

(3) United States Environmental Protection Agency. The EPA is responsible for enforcing the Federal CAA. The EPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California.

(4) California Air Resources Board. In California, the CARB, which is part of the California Environmental Protection Agency (Cal EPA), is responsible for meeting the state requirements of the Federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the California Ambient Air Quality Standards (CAAQS). The CAAQS are generally more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. Automobiles sold in California must meet the stricter emission standards established by the CARB. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level.

(5) Bay Area Air Quality Management District. The nine-county San Francisco Bay Area is considered, in air quality terms, an air basin. Overall, the air quality conditions in the San Francisco Bay Area are fairly good for a large metropolitan area due to favorable climate conditions that result in moderate temperatures and good ventilation. However, exceedances of air quality standards for ozone and respirable particulate matter pose challenges for air pollution control agencies. In addition, the CARB has identified the San Francisco Bay Area Air Basin as a transport contributor to adjacent air basins. So air pollutants emitted in the project area could contribute to air pollution problems in other areas of northern and central California.

The BAAQMD is primarily responsible for assuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. The BAAQMD has jurisdiction over much of the nine-county Bay Area. San Francisco Bay air quality attainment status is shown in Table IV.D-3.

Table IV.D-3: San Francisco Bay Area Attainment Status

Pollutant	Averaging Time	California Standards[a]		National Standards[b]	
		Concentration	Attainment Status	Concentration	Attainment Status
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment[c]
	1-Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide (NO_2)	Annual Mean	0.03 ppm (56 µg/m^3)		0.053 ppm (100 µg/m^3)	Attainment
	1-Hour	0.18 ppm (338 µg/m^3)	Attainment	Not Applicable	Not Applicable
Ozone (O_3)	8-Hour	0.07 ppm (137 µg/m^3)	Unclassified	0.08 ppm	Marginal
	1-Hour	0.09 ppm (180 µg/m^3)	Nonattainment	Not Applicable	Not Applicable[d]
Suspended Particulate Matter (PM_{10})	Annual Mean	20 µg/m^3	Nonattainment	Not Applicable	Not Applicable
	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassified
Suspended Particulate Matter ($PM_{2.5}$)	Annual Mean	12 µg/m^3	Nonattainment	15 µg/m^3	Attainment
	24-Hour	Not Applicable	Not Applicable	35 µg/m^3	Unclassified
Sulfur Dioxide (SO_2)	Annual Mean	Not Applicable	Not Applicable	0.03 ppm (80 µg/m^3)	Attainment
	24-Hour	0.04 ppm (105 µg/m^3)	Attainment	0.14 ppm (365 µg/m^3)	Attainment
	1-Hour	0.25 ppm (655 µg/m^3)	Attainment	Not Applicable	Not Applicable

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2 and PM_{10} are values that are not to be exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average, then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.

[b] National standards other than for O_3 and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. For example, the O_3 standard is attained if, during the most recent 3- year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than 1.

[c] In April 1998, the Bay Area was redesignated to Attainment for the national 8-hour CO standard.

[d] The National 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.

Lead (Pb) is not listed in the table because it has been in attainment since the 1980s.
ppm = parts per million g/m^3 = milligrams per cubic meter µg/m^3 = micrograms per cubic meter
Source: Bay Area Air Quality Management District, Bay Area Attainment Status, 2007.

(6) City of Oakland Air Quality Policies. The following are the air quality policies and action steps of the Open Space Conservation and Recreation (OSCAR) element of the City of Oakland's General Plan that apply to the proposed project:

- Policy CO-12.2: Coordinated Transportation Systems. Maintain a coordinated bus, rail, and ferry transit system which provides efficient service to major destinations and promotes alternatives to the single passenger auto.
  - Action CO-12.2.3: Improved Bicycle and Pedestrian Systems. Develop a viable bicycle and pedestrian circulation system, with routes providing safe, convenient access between residential neighborhoods and employment centers.
- Policy CO-12.6: Control of Dust Emissions. Require construction, demolition, and grading practices which minimize dust emissions.

These practices are currently required by the City and include the following:

- Avoiding earth moving and other major dust generating activities on windy days.
- Sprinkling unpaved construction areas with water during excavation, using reclaimed water where feasible. (Watering can reduce construction-related dust by 50 percent.)
- Covering stockpiled sand, soil, and other particulates with a tarp to avoid blowing dust.
- Covering trucks hauling dirt and debris to reduce spills. If spills do occur, they should be swept up promptly before materials become airborne.
- Preparing a comprehensive dust control program for major construction in populated areas or adjacent to sensitive uses like hospitals and schools.
- Operating construction and earth-moving equipment, including trucks, to minimize exhaust emissions.

(7) City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would reduce or avoid a project's potential air quality impacts.

Condition 17: Dust Control. *Prior to issuance of a demolition, grading, or building permit.* During construction, the project applicant shall require the construction contractor to implement the following measures required as part of BAAQMD basic and enhanced dust control procedures required for construction sites. These include:

Condition 18: Construction Emissions. *Prior to issuance of a demolition, grading, or building permit.* To minimize construction equipment emissions during construction, the project applicant shall require the construction contractor to:

a) Demonstrate compliance with BAAQMD Regulation 2, Rule 1 (General Requirements) for all portable construction equipment subject to that rule. BAAQMD Regulation 2, Rule 1, provides the issuance of authorities to construct and permits to operate certain types of portable equipment used for construction purposes (e.g., gasoline or diesel-powered engines used in conjunction with power generation, pumps, compressors, and cranes) unless such equipment complies with all applicable requirements of the "CAPCOA" Portable Equipment Registration Rule" or with all applicable requirements of the Statewide Portable Equipment Registration Program. This exemption is provided in BAAQMD Rule 2-1-105.

b) Perform low- NOx tune-ups on all diesel-powered construction equipment greater than 50 horsepower (no more than 30 days prior to the start of use of that equipment). Periodic tune-ups (every 90 days) should be performed for such equipment used continuously during the construction period.

Condition 29: Asbestos Removal in Structures. ***Prior to issuance of a demolition permit.*** If asbestos is found to be present in building materials to be removed, demolition and disposal is required to be conducted in accordance with procedures specified by Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing) of BAAQMD regulations, as may be amended.

Condition 30: Asbestos Removal in Soil. *Prior to issuance of a demolition, grading, or building permit.* To minimize the release of naturally occurring asbestos in the soil during construction, the project applicant shall require the construction contractor to demonstrate compliance with BAAQMD Asbestos Airborne Toxic Control Measures for Construction, Grading, Quarrying and Surface Mining Operations (implementing CCR section 93105) for activities that disturb the soil, such as grading, etc. The appropriate requirements are based on the size of the disturbed area as described in Table IV.D-4.

BASIC (Applies to ALL construction sites)

a) Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c) Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

d) Sweep daily (with water sweepers using reclaimed water if possible) all paved access roads, parking areas and staging areas at construction sites.

e) Sweep streets (with water sweepers using reclaimed water if possible) at the end of each day if visible soil material is carried onto adjacent paved roads.

f) Limit the amount of the disturbed area at any one time, where feasible.

g) Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

h) Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

i) Replant vegetation in disturbed areas as quickly as feasible.

j) Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

k) Limit traffic speeds on unpaved roads to 15 miles per hour.

l) Clean off the tires or tracks of all trucks and equipment leaving any unpaved construction areas.

Table IV.D-4: Requirements for Asbestos Removal in Soil

Construction Grading Operation Requirements	
A. Minimum Requirements where area to be disturbed with Construction Grading Operations is 1 acre or less	
Administrative Requirements	a) No notification required to the BAAQMD office; unless b) Upon discovery of naturally occurring asbestos, serpentine, or ultramafic rock the project applicant must notify the BAAQMD's Air Pollution Control Officer (APCO) by the next business day.
Dust Control Requirements	a) Vehicle speed shall be less than or equal to 15 mph b) Sufficient water shall be applied to the area prior to disturbance to prevent visible emissions from crossing project boundaries. c) Areas to be graded or excavated shall be kept adequately wetted to prevent visible emissions from crossing project boundaries. d) Storage piles kept shall be adequately wetted, treated with dust suppressant, or covered when the material is not being added or removed. e) Equipment must be washed down before moving from the property onto paved roadway. f) Visible track-out on paved public road must be cleaned using wet sweeping or High Efficiency Particulate Filters (HEPA) filter equipped vacuum device within 24 hours. g) Implement the preceding dust control measures within 24 hours upon discovery of naturally occurring asbestos, serpentine, or ultramafic rock.
B. Minimum Requirements where area to be disturbed with Construction Operations is More than 1 acre	
Administrative (Prior to the start of work)	a) Asbestos Dust Mitigation Plan submitted to BAAQMD and approved prior to engaging in any construction or grading operation. b) The Asbestos Dust Minimization Plan provisions shall be implemented at the beginning and maintained throughout the duration of the construction or grading activity.
Dust Control Requirements	The Asbestos Dust Minimization Plan shall include one or more provisions to address the following topics: a) Control for traffic on on-site unpaved roads, parking lots, and staging areas shall include: limiting vehicle speed to less than 15 mph, and one or more of the following: watering every two hours of active operations or sufficiently often to keep area wetted; applying chemical dust suppressants consistent with manufacturer's directions; maintaining gravel cover with a silt content less than 5% and asbestos content less than .25% as determined using the asbestos bulk test method; or any other measure as effective as those listed above. b) Control for earthmoving activities shall include one or more of the following: pre-wetting the ground to the depth of the anticipated cuts; suspending grading operations when wind speeds are high enough to result in dust emissions crossing the property line despite applicable of dust measures; application of water prior to any land clearing; or any other measure as effective. c) Storage piles shall be kept adequately wetted or covered with tarps when the material is not

Table IV.D-4 *Continued*

Construction Grading Operation Requirements	
	being added or removed. d) Storage piles must be stabilized when inactive for more than 7 days by implementing one or more of the following: adequately wetting the site, establishing and maintaining surface crusting material, chemical dust suppressant or stabilizer, covering with tarps or vegetative cover, installation of wind barriers of 50% porosity around three sides of the pile areas, or any measure as effective. e) Equipment must be washed down before moving from the property onto paved roadway. i. Track-out prevention and control measures shall include: ii. Removal of visible track-out on paved public road at any location where vehicles exit the work site using wet sweeping or High Efficiency Particulate Air (HEPA) filter equipped vacuum device at least one time per day. Installation of one or more of the following track-out prevention devices: gravel pad, tire shaker, wheel wash system, not less than 50 feet of pavement extending from intersection with paved public road, or other measure as effective. f) Control for offsite-transport shall include the following: maintenance of trucks such that no spillage can occur from holes or openings in cargo compartments; loads are adequately wetted; and either covered with tarps or loaded such that the material does not touch the front, back, or sides of the cargo compartment at any point less than 6" from the top and that at no point of the load extends above the top of the cargo compartment. g) Post project stabilization of disturbed surfaces shall occur using one or more of the following: establishing vegetative cover; placement of at least 3" of non- asbestos-containing material, paving, or other measure deemed sufficient to prevent 10 mph winds from causing visible emissions.
Administrative (After completion of work)	a) If required by the BAAQMD's APCO, the plan must include an air-monitoring component which shall specify the following: type of air sampling device; siting of the device; sampling of the device; sampling duration and frequency; and analytical method. b) The plan shall state the frequency with which the information will be reported to BAAQMD. c) The owner/operator shall keep maintain the following records for at least 7 years following completion of the project: results of any required air monitoring; documentation for any geologic evaluation conducted for the purposes of obtaining an exemption; and results of any bulk sampling conducted by the owner/operator to document applicability done or at the request of APCO.

ENHANCED (ALL "Basic" Controls listed above plus the following if the construction site is greater than 4 acres)

a) All "Basic" controls listed above, plus

b) Install sandbags or other erosion control measures to prevent silt runoff to public roadways

c) Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).

d) Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of such person shall be provided to the BAAQMD prior to the start of construction as well as posted on-site over the duration of construction.

e) Install appropriate wind breaks at the construction site to minimize wind blown dust.

Condition 54: Asbestos Remediation. *Prior to issuance of a demolition, grading, or building permit.* If asbestos-containing materials (ACM) are present, the project applicant shall submit specifications signed by a certified asbestos consultant for the removal, encapsulation, or enclosure of the identified ACM in accordance with all applicable laws and regulations, including but not necessarily limited to: California Code of Regulations, Title 8; Business and Professions Code; Division 3; California Health & Safety Code 25915-25919.7; and BAAQMD, Regulation 11, Rule 2, as may be amended.

b. Existing Climate and Air Quality. The following discussion provides brief summaries of regional air quality, local climate, and air quality, and air pollution climatology.

(1) Regional Air Quality. The City of Oakland is located in the San Francisco Bay Area, a large shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the strait known as the Golden Gate, a direct outlet to the Pacific Ocean. The second outlet extends to the northeast, along the west delta region of the Sacramento and San Joaquin Rivers.

The City of Oakland is within the jurisdiction of the BAAQMD, which regulates air quality in the San Francisco Bay Area. Air quality conditions in the San Francisco Bay Area have improved significantly since the BAAQMD was created in 1955. Ambient concentrations of air pollutants and the number of days during which the region exceeds air quality standards have fallen dramatically. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons. Ozone levels, measured by peak concentrations and the number of days over the State 1-hour standard, have declined substantially as a result of aggressive programs by the BAAQMD and other regional, State and federal agencies. The reduction of peak concentrations represents progress in improving public health; however the Bay Area still exceeds the State standard for 1-hour ozone. Levels of PM_{10} in the Bay Area have exceeded State standards at least two times per year during the past three years, and the Bay Area is considered a nonattainment area for this pollutant relative to the State standards. The Bay Area is an unclassified area for the federal PM_{10} standard.

No exceedances of the State or federal CO standards have been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for State and federal CO standards.

The BAAQMD's Bay Area 1991, 1994, 1997 and 2000 Clean Air Plans contain district-wide control measures to reduce CO and ozone precursor emissions (i.e., ROG and NOx). Ozone, in particular, results from the reaction of organic gases (ROG) and nitrogen oxide (NOx) in the atmosphere. To reduce ozone, its precursors (ROG and NOx) are regulated. The State standards for these pollutants are at least as stringent as the national standards. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

(2) Local Climate and Air Quality. Air quality is a function of both local climate and local sources of air pollution. The amount of a given air pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and/or dilute that pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain, and, for photochemical pollutants, sunshine.

The City of Oakland is located in the Northern Alameda and Western Contra Costa Region of the Basin. This climatological subregion stretches from Richmond to San Leandro. Its western boundary is defined by San Francisco Bay and its eastern boundary by the Oakland/Berkeley hills. The Oakland /Berkeley hills have a ridge line height of approximately 1,500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between San Francisco Bay and the lower hills.

In this area, marine air traveling through the Golden Gate, as well as across San Francisco and through the San Bruno Gap, is a dominant weather factor. The Oakland/Berkeley hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west. At the northern end, near Richmond, prevailing winds are from the south-southwest.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures in summer average in the mid-70's, with minimums in the mid-50's. Winter highs are in the mid- to high-50's, with lows in the low- to mid-40's.

The air pollution potential is lowest for the parts of the subregion that are closest to the bay, due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels. The air pollution potential at the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than communities directly east of the Golden Gate, because of the lower frequency of strong winds.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. The subregion is also traversed by frequently congested major freeways. Traffic and congestion, and the motor vehicle emissions they generate, are increasing.

Pollutant monitoring results for the years 2004 to 2006 (see Tables IV.D-5 and IV.D-6) at the Oakland (Alice Street) and San Francisco (Arkansas Street) ambient air quality monitoring stations indicate that air quality in the project area has generally been good. As indicated in the monitoring results, one violation of State PM_{10} standard in the year 2004 was recorded during the three-year period and no violation of federal PM_{10} standard was recorded during the three-year period. The federal $PM_{2.5}$ standard was not exceeded during the three-year period. State 1-hour ozone standards have not been exceeded. The federal 8-hour ozone standards have not been exceeded within the past three years at these monitoring stations. CO, SO_2, and NO_2 standards also were not exceeded in this area during the three-year period.

c. Air Quality Issues. There are five key air quality issues in the Bay Area: CO hotspots, vehicle emissions, fugitive dust, odors, and construction equipment exhaust, all of which are described below.

(1) Local Carbon Monoxide Hotspots. Local air quality is most affected by CO emissions from motor vehicles. CO is typically the pollutant of greatest concern because it is created in abundance by motor vehicles and it does not readily disperse into the air. Because CO does not readily disperse, areas of vehicle congestion can create "pockets" of high CO concentration called "hot spots." These pockets have the potential to exceed the State 1-hour standard of 20.0 ppm and/or the 8-hour standard of 9.0 ppm.

While CO transport is limited, it disperses with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthful levels that adversely affect local sensitive receptors (e.g., residents, schoolchildren, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service

Table IV.D-5: Results from the Oakland Ambient Air Quality Monitoring Stations, 2004 to 2006

Year	Ozone			Carbon Monoxide		Nitrogen Dioxide*		PM_{10}*	
	Max. 1-Hour (ppm)	California D-O-S	Max. 1-Hour (ppm)	California D-O-S	Max. 1-Hour (ppm)	California D-O-S	Max. 24-Hour (mg/m^3)	National D-O-S	California D-O-S
2004	0.093	0	2.9	0	0.063	0	48.6	0	1
2005	0.058	0	2.5	0	0.066	0	44.6	0	0
2006	0.053	0	2.7	0	0.107	0	44.5	0	0

D-O-S = Days Over Standard ppm = parts per million
ppb = parts per billion mg/m^3 = milligrams per cubic meter
*Closest monitoring station located at San Francisco-Arkansas Street.

Source: U.S. EPA and CARB, 2004 to 2006.

Table IV.D-6: Results from the Oakland Ambient Air Quality Monitoring Station Exceeded Standards, 2004 to 2006

Year	Ozone		Carbon Monoxide		Sulfur Dioxide*		$PM_{2.5}$*		
	Max. 8-Hour (ppm)	National D-O-S	Max. 8-Hour (ppm)	California D-O-S	Max. 24-Hour (ppm)	California D-O-S	Max. 24-Hour (mg/m^3)	National D-O-S	California D-O-S
2004	0.059	0	2.21	0	0.006	0	45.8	0	0
2005	0.054	0	2.09	0	0.007	0	43.6	0	0
2006	0.046	0	1.74	0	0.007	0	31.5	0	NA

D-O-S = Days Over Standard ppm = parts per million mg/m^3 = milligrams per cubic meter

*Closest monitoring station located at San Francisco-Arkansas Street.

Source: U.S. EPA and CARB, 2004 to 2006.

or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling is recommended to determine a project's effect on local CO levels.

(2) Vehicle Emissions. Long-term air emission impacts are those associated with changes in automobile travel within the City. Mobile source emissions would result from vehicle trips associated with increased vehicular travel. As is true throughout much of the U.S., motor vehicle use is projected to increase substantially in the region. The BAAQMD, local jurisdictions, and other parties responsible for protecting public health and welfare will continue to seek ways of minimizing the air quality impacts of growth and development in order to avoid further exceedances of the standards.

(3) Fugitive Dust. Fugitive dust emissions are generally associated with demolition, land clearing, exposure of soils to the air, and cut and fill operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions.

The U.S. EPA has developed an approximate emission factor for construction-related emissions of total suspended particulate of 1.2 tons per acre per month of activity. This factor assumes a moderate activity level, moderate silt content in soils being disturbed, and a semi-arid climate. The California Air Resources Board estimates that 64 percent of construction-related total suspended particulate

emissions is PM_{10}. Therefore, the emission factors for uncontrolled construction-related PM_{10} emissions are:

- 0.77 tons per acre per month of PM_{10}; or
- 51 pounds per acre per day of PM_{10}.

However, construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction. Rather than attempting to provide detailed quantification of anticipated construction emissions from projects, the BAAQMD suggests the following:

> "The determination of significance with respect to construction emissions should be based on a consideration of the control measures to be implemented. From the District's perspective, quantification of emissions is not necessary, although a lead agency may elect to do so. If all of the control measures indicated as appropriate, depending on the size of the project, are implemented, then air pollution from emissions from construction activities would be considered a less-than-significant impact."[2]

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial facilities within the region. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

(5) Construction Equipment Exhaust. Construction activities cause combustion emissions from utility engines, heavy-duty construction vehicles, equipment hauling materials to and from construction sites, and motor vehicles transporting construction crews. Exhaust emissions from construction activities vary daily as construction activity levels change. The use of construction equipment results in localized exhaust emissions.

2. Impacts and Mitigation Measures

This section discusses potential impacts to air quality that could result from implementation of Measure DD. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with Measure DD and identifies mitigation measures, as appropriate.

a. Criteria of Significance. Implementation of the project components would have a significant impact on air quality if it would:

1) Conflict with or obstruct implementation of the applicable air quality plan;
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

[22] Bay Area Air Quality Management District, 1966. *BAAQMD CEQA Guidelines Assessing the Air Quality Impacts of Projects and Plans*. April. (Amended in December 1999.)

3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
4) Expose sensitive receptors to substantial pollutant concentrations;
5) Frequently create substantial objectionable odors affecting a substantial number of people;
6) Contribute to CO concentrations exceeding the State AAQS of 9 ppm averaged over 8 hours and 20 ppm for 1 hour (Note: Pursuant to BAAQMD, localized carbon monoxide concentrations should be estimated for projects in which (1) vehicle emissions of CO would exceed 550 lb/day; (2) intersections or roadway links would decline to LOS E or F; (3) intersections operating at LOS E or F will have reduced LOS; or (4) traffic volume increase on nearby roadways by 10% or more unless the increase in traffic volume is less than 100 vehicles per hour);
7) Result in total emissions of ROG, NO_x, or PM_{10} of 15 tons per year or greater, or 80 pounds (36 kilograms) per day or greater;
8) Result in potential to expose persons to substantial levels of Toxic Air Contaminants (TAC), such that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million;
9) Result in ground level concentrations of non-carcinogenic TACs such that the Hazard Index would be greater than 1 for the MEI; or
10) Result in a substantial increase in diesel emissions.

b. Impacts and Mitigation Measures Applicable to all Project Components. The air quality impacts that would result from implementation of Measure DD would be essentially the same for each of the four project components as described below for both less-than-significant and significant impacts.

(1) Consistency with the Air Quality Plan. The most recent BAAQMD plan for attaining California Ambient Air Quality Standards, the Bay Area 2005 Ozone Strategy, was adopted by BAAQMD on January 4, 2006. The 2005 Ozone Strategy is the fourth triennial update of the BAAQMD's original 1991 Clean Air Plan (CAP). The 2005 Ozone Strategy demonstrates how the San Francisco Bay Area will achieve compliance with the State one-hour air quality standard for ozone and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The Ozone Strategy also includes stationary source control measures, mobile source control measures and transportation control measures. Although it is only required to address ozone pollution and associated control measures, the Ozone Strategy also discusses particulate matter pollution and reduction measures. Clean air plan projections are based on analysis and forecasts of air pollutant emissions throughout the entire region. The forecasts rely on projections of population and employment made by the Association of Bay Area Governments (ABAG), which are based on land use projections made by local jurisdictions (e.g., General Plan process). Most important are transportation control measures included in the CAP that the BAAQMD relies on local jurisdictions to implement. The Measure DD Implementation Project would not result in substantial increases in population and employment and is therefore consistent with ABAG projections used for *2005 Ozone Attainment Strategy*. As a result, the proposed project would be consistent with regional air quality planning and not result in a significant cumulative impact to air quality.

(2) Contribute to air quality violation. The City of Oakland is considered a non-attainment area for ozone and PM_{10} and $PM_{2.5}$. As noted above, the Bay Area 2005 Ozone Strategy, which also

addresses particulate matter, is the air quality plan that applies to projects within the City of Oakland. The primary sources of ozone are internal combustion engines and power plants. Therefore, the proposed project would contribute to regional ozone emissions in the form of emissions from construction vehicles. The project would contribute to particulate matter emissions through construction vehicle emissions and the disturbance of soil within the project site during the construction period.

Table IV.D-7: Summary of Potential Impacts – Air Quality

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Conflict with or obstruct implementation of the applicable air quality plan?	O	O	O	O
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	O	O	O	O
3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	O	O	O	O
4) Expose sensitive receptors to substantial pollutant concentrations?	O	O	O	O
5) Frequently create substantial objectionable odors affecting a substantial number of people?	O	O	O	O
6) Contribute to CO concentrations exceeding the State AAQS of 9 ppm averaged over 8 hours and 20 ppm for 1 hour ?	O	O	O	O
7) Result in total emissions of ROG, NOx, or PM_{10} of 15 tons per year or greater or 80 pounds (36 kilograms) per day or greater?	O	O	O	O
8) Result in potential to expose persons to substantial levels of toxic air contaminants, such that the probability of contracting cancer for the maximally exposed individual exceeds 10 in 1 million?	O	O	O	O
9) Result in ground level concentrations of non-carcinogenic TACs such that the hazard index would be greater than 1 for the MEI?	O	O	O	O
10) Result in a substantial increase in diesel emissions?	O	O	O	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact

○ Less-than-Significant or Less-than-Significant with standard Conditions of Approval
◉ Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
AIR-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007.

Construction activities would vary with each component of Measures DD. Construction activities for various project components may include the use of earthmoving equipment and water and pick-up trucks. Ground disturbance and the operation of motorized construction vehicles would incrementally increase ozone and particulate matter emissions in the region during the project construction period.

Temporary, construction period air quality impacts (for all pollutants) are considered less-than-significant if standard BAAQMD particulate matter control measures are implemented. Implementation of the Standard Conditions of Approval 17 and 18, which includes the required BAAQMD control measures, would reduce the project's construction period air quality impacts (including construction period conflicts with the 2005 Ozone Strategy) to a less-than-significant level.

Refer to Section IV.C, Transportation, Circulation, and Parking for a discussion of the project's impacts related to traffic. As described in that section, the proposed project is not expected to generate a substantial number of vehicle trips. Therefore, the project's operational-period ozone contribution would be less-than-significant, and the project would not conflict with the 2005 Ozone Strategy. The improvement of bicycle access and facilities, which is one of the key objectives of the project, is a transportation control measure included in the 2005 Ozone Strategy, and could improve air quality in the basin during the long-term.

(3) Cumulative Increase of Any Criteria Pollutant. Cumulative air quality impacts associated with criteria pollutants are evaluated based on both a quantification of the project-related air quality impacts and the consistency of the project with local and regional air quality plans (i.e., the *Oakland General Plan* and the Bay Area 2005 Ozone Strategy). At the local level, future cumulative traffic conditions would not result in any violation of the carbon monoxide standard. As a result, there would not be a cumulative impact to local air quality. Emissions of pollutants that affect regional air quality (i.e., ozone precursors and PM_{10}) associated with the project are predicted to be below the significant thresholds established by the BAAQMD, and therefore, would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is nonattainment under an applicable federal or state ambient air quality standard. This potential impact would be less than significant.

(4) Exposure of sensitive receptors to substantial pollutant concentrations. Sensitive receptors are facilities that house or attract children, the elderly, and people with illnesses or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors.

The operation of the project components of Measure DD would not generate pollutants and thus would not expose sensitive receptors to substantial pollutant concentrations. Construction of project components would temporarily increase localized emissions. As noted above however, temporary,

construction period air quality impacts (for all pollutants) are considered less-than-significant if standard BAAQMD particulate matter control measures are implemented. Implementation of Standard Conditions of Approval 17 and 18 would reduce construction emissions to a less-than-significant level.

(5) Objectionable Odors. The operation of the project components of Measure DD would not generate objectionable odors. Typically, major sources of odors include restaurants, manufacturing plants, and landfills. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects which are not expected to generate objectionable odors. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. This potential impact would be less than significant.

(6) CO Concentrations. Vehicular traffic associated with Measure DD would emit carbon monoxide (CO) into the air along roadway segments and near intersections. As previously described, because CO does not readily disperse, areas of vehicle congestion can create pockets of high CO concentrations, called "hot spots." Typically, high CO concentrations are associated with roadways or intersections operating at deficient levels of service (LOS) or with extremely high traffic volumes. An analysis of the potential CO hotspots was performed for intersections within the areas surrounding the Measure DD components.

Table IV.D-8 lists the 1-hour and 8-hour CO concentrations for the existing (2006) conditions and existing plus projects at 18 intersections in the project study area. Table IV.D-9 lists the future (2025) concentrations with and without the project.

Based on the methodology suggested by the U.S. EPA and the California Department of Transportation, the second highest CO concentrations monitored at the nearest air monitoring station in the past 2 years (in this case 3.3 ppm for the 1-hour period and 2.4 ppm for the 8-hour period) were used as the background CO concentrations. Emission factors for study scenarios were obtained from the latest confirmed CARB data.

Table IV.D-8 shows that 1-hour and 8-hour CO concentrations for all existing, with- and without-the-project would be below the federal and State CO standards. The 1-hour CO levels range from 4.0 to 6.9 ppm, much lower than the State CO standard of 20 ppm. The 8-hour CO levels range from 2.9 ppm to 4.9 ppm, also much lower then the State and federal standard of 9 ppm.

Table IV.D-9 shows that all cumulative (2025) 1-hour and 8-hour CO concentrations with the project would be below the federal and State CO standards. The 1-hour CO levels range from 3.4 ppm to 4.2 ppm, which are much lower then the State standard of 20 ppm. The 8-hour CO levels would range from 2.5 ppm to 3.0 ppm, which are much lower than the State standard of 9 ppm.

Based on the results of the traffic analysis, in some cases intersection traffic volumes were reduced with implementation of the proposed project. For those intersections, CO concentrations were also reduced with implementation of the project.

Table IV.D-8: CO Concentrations for Existing and Existing Plus Project Conditions

Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1 hr/8 hr (ppm)	Existing Plus Project/Existing 1-Hour CO Concentration (ppm)	Existing Plus Project/Existing 8-Hour CO Concentration (ppm)	Exceeds State Standards	
					1-Hr	8-Hr
Grand Avenue & Santa Clara Avenue	17	0.1 / 0.0	5.9 / 5.8	4.2 / 4.2	No	No
	15	0.1 / 0.1	5.7 / 5.6	4.1 / 4.0	No	No
	15	0.0 / 0.0	5.6 / 5.6	4.0 / 4.0	No	No
	12	0.2 / 0.1	5.6 / 5.4	4.0 / 3.9	No	No
Grand Avenue & MacArthur Boulevard	14	0.0 / 0.0	6.0 / 6.0	4.3 / 4.3	No	No
	14	0.1 / 0.0	5.9 / 5.8	4.2 / 4.2	No	No
	10	0.2 / 0.1	5.9 / 5.7	4.2 / 4.1	No	No
	10	0.3 / 0.2	5.9 / 5.6	4.2 / 4.0	No	No
Grand Avenue & El Embarcadero (WB)	10	1.2 / 0.8	6.5 / 5.3	4.6 / 3.8	No	No
	10	0.9 / 0.6	6.0 / 5.1	4.3 / 3.7	No	No
	10	0.8 / 0.5	5.9 / 5.1	4.2 / 3.7	No	No
	10	0.7 / 0.5	5.8 / 5.1	4.2 / 3.7	No	No
Lakeshore Drive & Lake Park Avenue	14	0.4 / 0.3	5.8 / 5.4	4.2 / 3.9	No	No
	13	0.5 / 0.4	5.7 / 5.2	4.1 / 3.7	No	No
	12	0.4 / 0.3	5.6 / 5.2	4.0 / 3.7	No	No
	10	0.5 / 0.3	5.6 / 5.1	4.0 / 3.7	No	No
Lakeshore Drive & MacArthur Boulevard	14	0.4 / 0.3	7.3 / 6.9	5.2 / 4.9	No	No
	14	0.2 / 0.1	7.0 / 6.8	5.0 / 4.9	No	No
	14	0.4 / 0.3	7.0 / 6.6	5.0 / 4.7	No	No
	10	-0.2 / -0.1	6.1 / 6.3	4.4 / 4.5	No	No
Lakeshore Drive & East 18th Street	14	0.6 / 0.4	6.0 / 5.4	4.3 / 3.9	No	No
	14	0.6 / 0.4	5.9 / 5.3	4.2 / 3.8	No	No
	12	0.3 / 0.2	5.5 / 5.2	3.9 / 3.7	No	No
	10	0.5 / 0.3	5.5 / 5.0	3.9 / 3.6	No	No
1st Avenue & International Boulevard	14	0.9 / 0.6	6.9 / 6.0	4.9 / 4.3	No	No
	14	0.8 / 0.6	6.7 / 5.9	4.8 / 4.2	No	No
	14	1.1 / 0.8	6.6 / 5.5	4.7 / 3.9	No	No
	12	0.5 / 0.4	6.0 / 5.5	4.3 / 3.9	No	No
12th Street & East 12th Street	14	0.2 / 0.1	6.9 / 6.7	4.9 / 4.8	No	No
	14	0.6 / 0.4	6.7 / 6.1	4.8 / 4.4	No	No
	12	0.5 / 0.3	6.6 / 6.1	4.7 / 4.4	No	No
	8	0.2 / 0.1	6.0 / 5.8	4.3 / 4.2	No	No
2nd Avenue & East 15th Street	8	0.0 / 0.0	4.1 / 4.1	3.0 / 3.0	No	No
	8	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
	8	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
	8	0.0 / 0.0	4.0 / 4.0	2.9 / 2.9	No	No
5th Avenue & East 12th Street	8	-0.1 / 0.0	4.8 / 4.9	3.5 / 3.5	No	No
	8	-0.1 / -0.1	4.7 / 4.8	3.4 / 3.5	No	No
	8	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
	8	0.0 / 0.0	4.6 / 4.6	3.3 / 3.3	No	No
5th Avenue & East 8th Street	17	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
	17	0.0 / 0.0	4.9 / 4.9	3.5 / 3.5	No	No
	16	0.0 / 0.0	4.8 / 4.8	3.5 / 3.5	No	No
	16	0.1 / 0.1	4.8 / 4.7	3.5 / 3.4	No	No
5th Avenue & Embarcadero Drive	10	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
	10	0.0 / 0.0	4.9 / 4.9	3.5 / 3.5	No	No
	8	0.0 / 0.0	4.8 / 4.8	3.5 / 3.5	No	No
	8	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No

Table IV.D-8 *Continued*

Intersection	Receptor Distance to Road Centerline (Meters)	Project Related Increase 1 hr/8 hr (ppm)	Existing Plus Project/Existing 1-Hour CO Concentration (ppm)	Existing Plus Project/Existing 8-Hour CO Concentration (ppm)	Exceeds State Standards	
					1-Hr	8-Hr
Harrison Street & 27th Street	14	0.2 / 0.1	5.9 / 5.7	4.2 / 4.1	No	No
	14	0.1 / 0.1	5.7 / 5.6	4.1 / 4.0	No	No
	14	0.2 / 0.1	5.6 / 5.4	4.0 / 3.9	No	No
	14	0.3 / 0.2	5.5 / 5.2	3.9 / 3.7	No	No
Harrison Street & Grand Avenue	17	-0.1 / 0.0	6.4 / 6.5	4.6 / 4.6	No	No
	17	-0.1 / -0.1	6.3 / 6.4	4.5 / 4.6	No	No
	17	0.2 / 0.1	6.2 / 6.0	4.4 / 4.3	No	No
	16	0.2 / 0.1	6.2 / 6.0	4.4 / 4.3	No	No
Lakeside Drive & Jackson Street	10	0.4 / 0.3	5.3 / 4.9	3.8 / 3.5	No	No
	10	0.4 / 0.3	5.1 / 4.7	3.7 / 3.4	No	No
	10	0.4 / 0.3	5.1 / 4.7	3.7 / 3.4	No	No
	10	0.4 / 0.3	5.0 / 4.6	3.6 / 3.3	No	No
Lakeside Drive & 14th Street	14	0.0 / 0.0	4.8 / 4.8	3.5 / 3.5	No	No
	10	-0.1 / -0.1	4.7 / 4.8	3.4 / 3.5	No	No
	10	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
	10	0.0 / 0.0	4.7 / 4.7	3.4 / 3.4	No	No
Oak Street & 10th Street	14	0.1 / 0.1	4.6 / 4.5	3.3 / 3.2	No	No
	14	0.1 / 0.1	4.4 / 4.3	3.2 / 3.1	No	No
	14	0.1 / 0.1	4.4 / 4.3	3.2 / 3.1	No	No
	8	-0.1 / -0.1	4.2 / 4.3	3.0 / 3.1	No	No
Madison Street & 7th Street East	17	0.0 / 0.0	5.5 / 5.5	3.9 / 3.9	No	No
	16	0.0 / 0.0	5.1 / 5.1	3.7 / 3.7	No	No
	13	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
	13	0.0 / 0.0	5.0 / 5.0	3.6 / 3.6	No	No
Oak Street & 7th Street East	16	0.2 / 0.1	5.3 / 5.1	3.8 / 3.7	No	No
	14	0.0 / 0.0	5.1 / 5.1	3.7 / 3.7	No	No
	13	0.1 / 0.1	5.0 / 4.9	3.6 / 3.5	No	No
	7	-0.1 / -0.1	4.7 / 4.8	3.4 / 3.5	No	No

Includes ambient 1-hour concentration of 3.3 ppm and ambient 8-hour concentration of 2.4 ppm. Measured at the 822 Alice St., Oakland,CA, AQ Station (Alameda County).

Table IV.D-9: CO Concentrations for Cumulative (2025) Plus Project Conditions

Intersection	Receptor Distance to Road Centerline (Meters)	Cumulative (2025) Plus Project 1-Hour CO Concentration (ppm)	Cumulative (2025) Plus Project 8-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
Grand Avenue & Santa Clara Avenue	17	3.8	2.8	No	No
	15	3.8	2.8	No	No
	15	3.8	2.8	No	No
	12	3.8	2.8	No	No
Grand Avenue & MacArthur Boulevard	14	3.9	2.8	No	No
	14	3.9	2.8	No	No
	10	3.9	2.8	No	No
	10	3.9	2.8	No	No
Grand Avenue & El Embarcadero (WB)	10	3.9	2.8	No	No
	10	3.8	2.8	No	No
	10	3.8	2.8	No	No
	10	3.7	2.7	No	No
Lakeshore Drive & Lake Park Avenue	14	3.9	2.8	No	No
	13	3.8	2.8	No	No
	12	3.8	2.8	No	No
	10	3.8	2.8	No	No
Lakeshore Drive & MacArthur Boulevard	14	4.0	2.9	No	No
	14	4.0	2.9	No	No
	14	4.0	2.9	No	No
	10	3.9	2.8	No	No
Lakeshore Drive & East 18th Street	14	3.7	2.7	No	No
	14	3.7	2.7	No	No
	12	3.6	2.6	No	No
	10	3.6	2.6	No	No
1st Avenue & International Boulevard	14	4.0	2.9	No	No
	14	3.8	2.8	No	No
	14	3.8	2.8	No	No
	12	3.8	2.8	No	No
12th Street & East 12th Street	14	4.2	3.0	No	No
	14	4.1	3.0	No	No
	12	4.1	3.0	No	No
	8	3.9	2.8	No	No
2nd Avenue & East 15th Street	8	3.5	2.5	No	No
	8	3.5	2.5	No	No
	8	3.4	2.5	No	No
	8	3.4	2.5	No	No
5th Avenue & East 8th Street	8	3.9	2.8	No	No
	8	3.8	2.8	No	No
	8	3.8	2.8	No	No
	8	3.7	2.7	No	No
5th Avenue & Embarcadero Drive	17	3.9	2.8	No	No
	17	3.8	2.8	No	No
	16	3.8	2.8	No	No
	16	3.7	2.7	No	No
Harrison Street & 27th Street	10	3.8	2.8	No	No
	10	3.8	2.8	No	No
	8	3.8	2.8	No	No
	8	3.8	2.8	No	No
Harrison Street & Grand Avenue	14	4.0	2.9	No	No

Table IV.D-9 *Continued*

Intersection	Receptor Distance to Road Centerline (Meters)	Cumulative (2025) Plus Project 1-Hour CO Concentration (ppm)	Cumulative (2025) Plus Project 8-Hour CO Concentration (ppm)	Exceeds State Standards	
				1-Hr	8-Hr
	14	3.9	2.8	No	No
	14	3.9	2.8	No	No
	14	3.9	2.8	No	No
Lakeside Drive & Jackson Street	17	3.7	2.7	No	No
	17	3.6	2.6	No	No
	17	3.6	2.6	No	No
	16	3.6	2.6	No	No
Lakeside Drive & 14th Street	10	3.7	2.7	No	No
	10	3.7	2.7	No	No
	10	3.7	2.7	No	No
	10	3.6	2.6	No	No
Oak Street & 10th Street	14	3.6	2.6	No	No
	10	3.6	2.6	No	No
	10	3.5	2.5	No	No
	10	3.5	2.5	No	No
Madison Street & 7th Street East	14	4.1	3.0	No	No
	14	4.0	2.9	No	No
	14	4.0	2.9	No	No
	8	3.9	2.8	No	No
Oak Street & 7th Street East	17	3.9	2.8	No	No
	16	3.9	2.8	No	No
	13	3.8	2.8	No	No
	13	3.8	2.8	No	No

Includes ambient 1-hour concentration of 3.3 ppm and ambient 8-hour concentration of 2.4 ppm. Measured at the 822 Alice St., Oakland,CA, AQ Station (Alameda County).

(7) Regional Air Emissions. Regional air emissions are generated by land use development projects, primarily by the motor vehicle trips generated by the projects. These are often referred to as "indirect sources" and include projects such as shopping centers, office buildings, and residential developments. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects. These projects are not expected to generate significant vehicle trips; therefore, regional emissions associated with the implementation of Measure DD would be less than significant.

(8) Toxic Air Contaminants (Significance Criteria 8-10). The CARB has identified diesel engine particulate matter as a toxic air contaminant. Facilities that may have substantial diesel exhaust emissions include the following: truck stop, warehouse/distribution center, large retail or industrial facility, high volume transit center, school with high volume of bus traffic, high volume freeway, high volume arterial/roadway with high level of diesel traffic. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects.

Implementation of the proposed project would not locate sensitive receptors near facilities with substantial diesel exhaust or expose existing sensitive receptors to substantial diesel exhaust emissions. Construction of the proposed project components could require the use of diesel operated engines; however, the construction duration would be temporary. Health risk assessments related to toxic air contaminants are based on exposure over a 70-year period. Due to the temporary nature of construction, exhaust from construction equipment would not be considered a significant health risk.

c. Impacts and Mitigation Measures Unique to Specific Project Components. There are no specific project component impacts associated with air quality.

E. NOISE

This section describes existing noise conditions for the Measure DD Implementation Project area, describes criteria for determining the significance of noise impacts, and estimates the likely noise that would result from the proposed project. Mitigation measures are recommended to reduce project-related noise impacts to a less-than-significant level, as appropriate.

1. Setting

The setting section begins with an introduction to several key concepts and terms that are used in evaluating noise. It then explains the various agencies that regulate the noise environment in the City of Oakland and summarizes key standards that are applied to proposed development. This setting section concludes with a description of current noise sources that affect the project site and the noise conditions that are experienced in the project site vicinity.

a. Characteristics of Sound. Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: *pitch* and *loudness*. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effects on adjacent sensitive land uses.

(1) Measurement of Sound. The decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. Furthermore, sound intensity is measured through the A-weighted scale (dBA) to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound in a manner similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. Table IV.E-1 contains a list of typical acoustical terms and definitions. Table IV.E-2 shows representative outdoor and indoor noise levels in units of dBA.

The 0 point on the dBA scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dBA or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness.

Table IV.E-1: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of five decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, 1991.

Table IV.E-2: Typical A-Weighted Sound Levels

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments
Near Jet Engine	140	Deafening
Civil Defense Siren	130	Threshold of pain
Hard Rock Band	120	Threshold of feeling
Accelerating Motorcycle at a Few Feet Away	110	Very loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very loud
Ambulance Siren; Food Blender	95	Very loud
Garbage Disposal	90	Very loud
Freight Cars; Living Room Music	85	Loud
Pneumatic Drill; Vacuum Cleaner	80	Loud
Busy Restaurant	75	Moderately loud
Near Freeway Auto Traffic	70	Moderately loud
Average Office	60	Moderate
Suburban Street	55	Moderate
Light Traffic; Soft Radio Music in Apartment	50	Quiet
Large Transformer	45	Quiet
Average Residence Without Stereo Playing	40	Faint
Soft Whisper	30	Faint
Rustling Leaves	20	Very faint
Human Breathing	10	Very faint

Source: Compiled by LSA Associates, Inc., 2004.

As noise spreads from a source, it loses energy so that as the noise receiver moves farther away from the noise source, the perceived noise level decreases. Geometric spreading causes the sound level to attenuate or decrease, generally resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on the dBA scale. CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within one dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours. Typical A-weighted sound levels from various sources are described in Table IV.E-2.

Other noise rating scales of importance when assessing annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions, and addresses the annoying aspects of intermittent noise.

Noise impacts are generally considered at three levels: audible, potentially audible, and inaudible. Audible impacts refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dBA or greater, since this level has been found to be barely perceptible in exterior environments. Potentially audible impacts refer to a change in the noise level between 1 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. Changes in noise levels of less than 1 dB are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

(2) Psychological and Physiological Effects of Noise. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the ear, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will result in dizziness or loss of equilibrium.

b. Noise Regulatory Framework. This section summarizes the regulatory framework related to noise, including federal, State, and City of Oakland plans, policies and standards.

(1) U.S. Environmental Protection Agency (EPA). In 1972 Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and

establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels), as shown in Table IV.E-3. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dBA. The "(24)" signifies an L_{eq} duration of 24 hours. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

The noise effects associated with an outdoor L_{dn} of 55 dBA are summarized in Table IV.E-3. At 55 dBA L_{dn}, 95 percent sentence clarity (intelligibility) may be expected at 3.5 meters, and no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

Table IV.E-3: Summary of Human Effects in Areas Exposed to 55 dBA L_{dn}

Type of Effects	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 0.35 meters. 99 percent sentence intelligibility (average) at 1.0 meters. 95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action."
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, 1974. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March.

(2) State of California. The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA CNEL in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA CNEL.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses. However, the City has adopted and modified the State's land use compatibility guidelines, as discussed below.

(3) City of Oakland. Locally, the City of Oakland addresses noise in the City's General Plan Noise Element, the Municipal Code Noise Ordinances, and in the Standard and Uniformly Applied Conditions of Approval.

City of Oakland's General Plan Noise Element and the Municipal Code Noise Ordinances. The City of Oakland adopted a revised Noise Element in June of 2005. The City has established exterior noise thresholds of 60 dBA L_{dn} as normally acceptable for residential uses and 65 dBA L_{dn} for commercial uses. For residential uses, noise levels exceeding 60 dBA L_{dn} are conditionally acceptable with an analysis of noise reduction measures to achieve the interior noise standard of 45 dBA L_{dn}. Table IV.E-4 shows the maximum allowable receiving noise level for residential and commercial uses.

Table IV.E-4: City of Oakland Operational Noise Standards at Receiving Property Line, dBA

Cumulative Number of Minutes in Either the Daytime or Nighttime One Hour Time Period	Residential Daytime 7:00 a.m. to 10:00 p.m.	Residential Nighttime 10:00 p.m. to 7:00 a.m.	Commercial Use, Anytime
20	60	45	65
10	65	50	70
5	70	55	75
1	75	60	80
0	80	65	85

Source: City of Oakland Municipal Code Section 17.120.050 Noise

The following are the noise policies and action steps of the Noise Element and other elements of the General Plan that apply to the proposed project.

- Policy 1: Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.
  - Action 1.1: Use the noise-land use compatibility matrix (Figure 6 *of the Noise Element*) in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.
  - Action 1.2: Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.
  - Action 1.3: Continue working with the Alameda County Community Development Agency (in its role as the county's airport land use commission) and with the Port of Oakland to ensure consistency with the county's airport land-use plan of the city's various master-planning documents, zoning ordinance and land-use development proposals near Oakland's airport.
- Policy 2: Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.
  - Action 2.1: Review the various noise prohibitions and restrictions under the City's nuisance noise ordinance and revise the ordinance if necessary.
  - Action 2.2: As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks and motorcycles.
  - Action 2.3: Encourage the Port of Oakland to continue promoting its noise abatement office and programs for Oakland International Airport.
- Policy 3: Reduce the community's exposure to noise by minimizing the noise levels that are *received* by Oakland residents and others in the City. (This policy addresses the *reception* of noise whereas Policy 2 addresses the *generation* of noise.)
  - Action 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

- Action 3.2: Review the City's noise performance standards and revise them as appropriate to be consistent with City Council policy.
- Action 3.3: Demand that Caltrans implement sound barriers, building retrofit programs and other measures to mitigate to the maximum extent feasible noise impacts on residential and other sensitive land uses from any new, widened or upgraded roadways; any new sound barrier must conform with City policies and standards regarding visual and aesthetic resources and quality.

- Policy I/C4.2: Minimizing nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls.
- Policy T6.1: Posting maximum speeds. Collector streets shall be posted at the lowest possible speed (usually a maximum speed of 25 miles per hour), except where a lower speed is dictated by safety and allowable by law.
- Policy W1.3: Reducing land use conflicts. Land uses and impacts generated from Port or neighborhood activities should be buffered, protecting adjacent residential areas from the impacts of seaport, airport, or other industrial uses. Appropriate siting of industrial activities, buffering (e.g., landscaping, fencing, transitional uses, etc.), truck traffic management efforts, and other mitigations should be used to minimize the impact of incompatible uses.
- Policy N5.2: Buffering residential areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools.
- Policy N11.4: Alleviating Public Nuisances. The City should strive to alleviate public nuisances and unsafe and illegal activities. Code Enforcement efforts should be given as high a priority as facilitating the development process. Public nuisance regulations should be designed to allow community members to use City codes to facilitate nuisance abatement in their neighborhood.

The noise ordinances of the City's Municipal Code (Section 17.120 and Section 8.18) also regulate the maximum allowable daytime average receiving noise level for construction activity. These noise levels are shown in Table IV.E-5.

Table IV.E-5: City of Oakland Construction Noise Standards at Receiving Property Line, dBA

	Daily 7:00 a.m. to 7:00 p.m.	Weekends 9:00 a.m. to 8:00 p.m.
Short-Term Operation [a]		
Residential	80	65
Commercial, Industrial	85	70
Long-Term Operational [b]		
Residential	65	55
Commercial, Industrial	70	60

[a] Short-Term construction or demolition operation is less than 10 days
[b] Long-Term construction or demolition operation is 10 days or more
Source: City of Oakland Municipal Code Section 17.120.050 Noise

City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project complies with the City's Noise Ordinance with regards to construction related noise.

Condition 19: Days/Hours of Construction Operation. *Ongoing throughout demolition, grading, and/or construction.* The project applicant shall require construction contractors to limit standard construction activities as follows.

a) Construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except that pile driving and/or other extreme noise generating activities greater than 90 dBA limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday.

b) Any construction activity proposed to occur outside of the standard hours of 7:00 am to 7:00 pm Monday through Friday for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of

construction is shortened and such construction activities shall only be allowed with the prior written authorization of the Building Services Division.

c) Construction activity shall not occur on Saturdays, with the following possible exceptions:

- Prior to the building being enclosed, requests for Saturday construction for special activities (such as concrete pouring which may require more continuous amounts of time), shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened. Such construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division.

- After the building is enclosed, requests for Saturday construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division, and only then within the interior of the building with the doors and windows closed.

d) No extreme noise generating activities (greater than 90 dBA) shall be allowed on Saturdays, with no exceptions.

e) No construction activity shall take place on Sundays or Federal holidays.

f) Construction activities include but are not limited to: truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

Condition 20: **Noise Control.** *Ongoing throughout demolition, grading, and/or construction.* To reduce noise impacts due to construction, the project applicant shall require construction contractors to implement a site-specific noise reduction program, subject to city review and approval, which includes the following measures:

a) Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).

b) Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

c) Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.

d) If feasible, the noisiest phases of construction shall be limited to less than 10 days at a time.

Conditions 21: Noise Complaint Procedures. *Ongoing throughout demolition, grading, and/or construction.* Prior to the issuance of each building permit, along with the submission of construction documents, the project applicant shall submit to the City Building Services Division a list of measures to respond to and track complaints pertaining to construction noise. These measures shall include:

a) A procedure and phone numbers for notifying the City Building Services Division staff and Oakland Police Department; (during regular construction hours and off-hours);

b) A sign posted on-site pertaining with permitted construction days and hours and complaint procedures and who to notify in the event of a problem. The sign shall also include a listing of both the City and construction contractor's telephone numbers (during regular construction hours and off-hours);

c) The designation of an on-site construction complaint and enforcement manager for the project;

d) Notification of neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of extreme noise generating activities about the estimated duration of the activity; and

e) A preconstruction meeting shall be held with the job inspectors and the general contractor/on-site project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

Condition 22: Interior Noise. *Prior to issuance of a building permit.* If necessary to comply with the interior noise requirements of the City of Oakland's General Plan Noise Element and achieve an acceptable interior noise level, noise reduction in the form of sound-rated assemblies (i.e., windows, exterior doors, and walls) shall be incorporated into project building design, based upon recommendations of a qualified acoustical engineer. Final recommendations for sound-rated assemblies will depend on the specific building designs and layout of buildings on the site and shall be determined during the design phase.

Condition 27: Pile Driving and Other Extreme Noise Generators. *Ongoing throughout demolition, grading, and/or construction.* To further reduce potential pier drilling, pile driving and/or other extreme noise generating construction impacts greater than 90dBA, a set of site-specific noise attenuation measures shall be completed under the supervision of a qualified acoustical consultant. Prior to commencing construction, a plan for such measures shall be submitted for review and approval by the City to ensure that maximum feasible noise attenuation will be achieved. This plan shall be based on the final design of the project. A third-party peer review, paid for by the project applicant, may be required to assist the City in evaluating the feasibility and effectiveness of the noise reduction plan submitted by the project applicant. A special inspection deposit is required to ensure compliance with the noise reduction plan. The amount of the deposit shall be determined by the Building Official, and the deposit shall be submitted by the project applicant concurrent with submittal of the noise reduction plan. The noise reduction plan shall include, but not be limited to, an evaluation of the following measures. These attenuation measures shall include as many of the following control strategies as feasible:

a) Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings;

b) Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;

c) Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site;

d) Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example; and

e) Monitor the effectiveness of noise attenuation measures by taking noise measurements.

c. Existing Noise Environment. The project components are located in an urban area. The following section describes the existing noise environment and identifies primary noise sources in each of the component areas of the project.

(1) Ambient Noise Conditions. An LSA noise technician conducted ambient noise monitoring near sensitive receptors adjacent to proposed project sites between the hours of 9:00 a.m. and 4:00 p.m. on January 31, 2007. These ambient (20-minute) noise measurements were conducted to document the existing noise environment and capture the noise levels associated with operations or activities in the project areas at six representative sensitive receptor locations. The noise level measurements were performed using a Larson Davis Model 720 Type II sound level meter. Table IV.E-6 presents the results of these measurements. Maximum and peak noise levels were recorded as well as the equivalent continuous noise level measure L_{eq}. The maximum and peak noise levels all reflect vehicular traffic noise sources. The meteorological conditions at the project site during the short-term noise monitoring are shown in Table IV.E-7.

The following measurement procedures were utilized during the short-term noise monitoring:

- Set up sound level meter at a height of 1.5 m (5 ft);
- Calibrate sound level meter;
- Commence noise monitoring;

Table IV.E-6: Ambient Noise Monitoring Results, dBA

Monitoring Locations	Start Time	L_{eq}	L_{max}	L_{min}
Lake Merritt and Lake Merritt Channel – Group 1				
El Embarcadero - by Lakeview Branch Library	9:05	63.3	83.9	56.6
#1555 Lakeside Drive - across from Municipal Boat House	10:20	65.6	79.6	50.0
Peralta Park - next to Lake Merritt Channel	11:50	55.2	84.9	47.0
1200 Lakeshore Avenue - by 14th Street	12:30	64.0	80.2	53.5
Waterfront Trail – Group 2				
E. Embarcadero/ East Street – near Condos by Estuary Park	11:05	57.6	80.7	46.5
Recreational Facilities – Group 3				
Ira Jinkins Park/Recreation Center - near elementary school	2:00	59.4	82.9	54.3

Source: LSA Associates, Inc., January 31, 2007.

Table IV.E-7: Meteorological Conditions for Noise Monitoring

Monitoring Locations	Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temp (F)	Relative Humidity (%)
Lake Merritt and Lake Merritt Channel – Group 1				
El Embarcadero – by Lakeview Branch Library	3.3	1.0	52.1	76
#1555 Lakeside Drive - across from Municipal Boat House	3.0	0.9	53.6	78
Peralta Park - next to Lake Merritt Channel	4.2	1.1	54.4	70
1200 Lakeshore Avenue - by 14th Street	3.1	0.9	53.8	70
Waterfront Trail – Group 2				
E. Embarcadero/ East Street – near Condos by Estuary Park	2.7	0.9	56.2	69
Recreational Facilities – Group 3				
Ira Jinkins Park/ Recreation Center - near elementary school	7.5	2.7	56.5	54

Source: LSA Associates, Inc., January 31, 2007

- Collect site-specific data such as date, time, direction of traffic, distance from the sound level meter to the right-of-way and/or sensitive receptors, and meteorological conditions;
- Stop measurement after 20 minutes; and
- Calibrate sound level meter.

Existing Railroad Noise Levels. Railroad activities in the City of Oakland include the Union Pacific Railroad and the Bay Area Rapid Transit rail lines. According to the City of Oakland General Plan, railroad noise levels at 100 feet from the railroad tracks are up to 110 dBA L_{dn} with warning horns and 95 dBA L_{dn} without warning horns. Typical BART train noise levels at 100 feet from the rail line tracks are up to 85 dBA. The existing rail operations currently contribute to the noise environment at adjacent receptors and would continue into the future. The proposed project does not include modifications to the Union Pacific Railroad and would not incorporate construction of any new sensitive receptors within railroad noise contours.

Existing Aircraft Noise Levels. The project area is approximately 1 to 5 miles north of the Oakland International Airport and 9 to 12 miles northeast of San Francisco International Airport. Although the project component areas experience audible aircraft noise, they do not lie within the 60 dBA contour lines of these airports.

(2) Lake Merritt and Lake Merritt Channel (Group 1). Vehicular traffic is a major source of ambient noise for the Lake Merritt and Lake Merritt Channel group project area as it is in many urban settings. Ambient noise measurements were taken at four representative sensitive locations within the Lake Merritt and Lake Merritt Channel group area. The noise monitoring results, shown in Table IV.E-6, indicate existing ambient noise levels range from 55.2 dBA L_{eq} to 65.6 dBA L_{eq}.

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the Lake Merritt and Lake Merritt Channel group. The resultant noise levels were weighed and summed over a 24-hour period in order to determine the L_{dn} values. The existing 2006 and cumulative 2025 traffic volumes for roadway segments were used in the traffic noise impact analysis. Table IV.E-8 shows the modeled existing traffic noise levels adjacent to the roadway segments in the Lake Merritt and Lake Merritt Channel group area.

(3) Waterfront Trail (Group 2). Traffic, railroads, commercial facilities, and industrial facilities are the primary noise sources along the Waterfront Trail. This group also experiences audible aircraft noise due to its proximity to Oakland International Airport; however, it does not lie within the 60 dBA contour lines of the airport. An ambient noise measurement was taken at Estuary Park. The noise monitoring results, shown in Table IV.E-6, indicate an existing ambient noise level of 57.6 dBA L_{eq} within the Waterfront Trail area.

(4) Recreational Facilities (Group 3). Existing primary noise sources at the Recreational Facilities include traffic and railroad related noise sources. Ambient noise measurements were taken at the proposed site of the East Oakland Sports Complex on January 31, 2007. Results indicate an existing ambient noise level of 59.4 dBA L_{eq} at the site. Traffic noise from I-880 is the primary traffic noise source. This project component area also experiences audible aircraft noise; however, it does not lie within the 60 dBA contour lines of an airport.

(5) City-wide Creeks (Group 4). The existing ambient noise levels surrounding the extensive City-wide Creek group is characteristic of the existing urban environment. Vehicular traffic is a major source of ambient noise levels in urban settings. Other noise sources in the urban setting include industrial, commercial, railroad, and aircraft related noise sources.

2. Impacts and Mitigation Measures

This section discusses potential impacts related to noise that could result from implementation of the proposed project components. The section begins with the criteria of significance, which establish the thresholds used to determine whether an impact is significant. The latter part of the section presents project impacts and identifies mitigation measures, as appropriate.

a. Criteria of Significance. The Measure DD Implementation Project would have a significant noise impact if it would:

1) Expose persons to or generate noise levels in excess of standards established in the Oakland general plan or applicable standards of other agencies (e.g., OSHA);
2) Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise *(Table IV.E-4)*;
3) Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding construction noise *(Table IV.E-5)*, except if an acoustical analysis is performed and all feasible mitigation measures imposed, including the standard City of Oakland noise measures adopted by the Oakland City Council on January 16, 2001.

Table IV.E-8: Existing (2006) Baseline Traffic Noise Levels

Roadway Segment	ADT[a]	Center-line to 70 L_{dn} (feet)	Center-line to 65 L_{dn} (feet)	Center-line to 60 L_{dn} (feet)	L_{dn} (dBA) 50 feet from Centerline of Outermost Lane
Grand Avenue (MacArthur Boulevard to El Embarcadero)	22,500	< 50[b]	81	171	66.2
Grand Avenue (El Embarcadero to Euclid Avenue)	21,800	< 50	79	167	66.1
El Embarcadero (Lakeshore Avenue to Grand Avenue)	4,600	< 50	< 50	60	60.1
Lakeshore Avenue (MacArthur Boulevard to El Embarcadero)	15,800	< 50	65	135	64.7
Lakeshore Avenue (El Embarcadero to Boden Way)	19,800	< 50	75	157	65.6
Harrison Street (Grand Avenue to 20th Street)	29,500	< 50	106	208	65.6
Lakeside Drive (19th Street to 20th Street)	16,700	< 50	67	140	64.9
Lakeside Drive (14th Street to 17th Street)	9,000	< 50	< 50	94	62.2
19th Street (Lakeside Drive to Harrison Street)	1,200	< 50	< 50	< 50	54.2
Madison Street (19th Street to 17th Street)	7,400	< 50	< 50	82	61.9
17th Street (Madison Street to Lakeside Drive)	900	< 50	< 50	< 50	53.0
14th Street (Oak Street to Madison Street)	12,400	< 50	56	115	63.6
12th Street (Oak Street to Madison Street)	9,600	< 50	< 50	98	62.5
10th Street (Oak Street to Madison Street)	3,600	< 50	< 50	53	58.2
14th Street (East of Oak Street)	13,600	< 50	59	123	64.0
1st Avenue (East 16th Street to Foothill Boulevard)	21,300	< 50	82	166	65.1
12th Street (Fallon Street to Oak Street)	9,100	< 50	< 50	95	62.3
Oak Street (11th Street to 12th Street)	8,600	< 50	< 50	91	62.0
1st Avenue (East 15th Street to East 14th Street)	13,900	< 50	58	124	64.6
12th Street (3rd Avenue to 2nd Avenue)	10,900	< 50	< 50	106	63.0
2nd Avenue (12th Street to 14th Street)	6,900	< 50	< 50	78	61.8
5th Avenue (12th Street to 14th Street)	6,300	< 50	< 50	73	61.4
10th Street (4th Avenue to 2nd Avenue)	5,400	< 50	< 50	66	60.8
10th Street (2nd Avenue to Fallon Street)	5,400	< 50	< 50	66	60.8
8th Street (5th Avenue to Lake Merritt Channel)	13,300	< 50	58	121	63.9
Embarcadero East (5th Avenue to Lake Merritt Channel)	7,100	< 50	< 50	79	62.0

[a] Average Daily Traffic volume.
[b] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
Source: LSA Associates Inc., February 2007

During the hours of 7 p.m. to 7 a.m. on weekdays and 8 p.m. to 9 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard *(Table IV.E-5)*;

4) Violates the City of Oakland Noise Ordinance (Oakland Municipal Code Section 8.18.020) regarding nuisance of persistent construction-related noise;

5) Create a vibration which is perceptible without instruments by the average person at or beyond any lot line containing vibration-causing activities not associated with motor vehicles, trains, and temporary construction or demolition work, except activities located within the (a) M-40 zone or (b) M-30 zone more than 400 feet from any legally occupied residential property

(Oakland Planning Code Section 17.120.060);

6) Generate interior L_{dn} or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24);

7) Result in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

8) Conflicts with state land use compatibility guidelines for all specified land uses for determination of acceptability of noise (Source: State of California, Governor's Office of Planning and Research, *General Plan Guidelines, 2003*);

9) Be located within an airport land use plan and would expose people residing or working in the project area to excessive noise levels; or

10) Be located within the vicinity of a private airstrip, and would expose people residing or working in the project area to excessive noise levels.

The level of noise impacts associated with the project are discussed in the following section and summarized in Table IV.E-9.

b. Impacts and Mitigation Measures Applicable to all Project Components. The following section identifies the potential impacts associated with project implementation on sensitive receptors located adjacent to all proposed project components.

Established Noise Standards. The proposed project would construct recreational facilities and make water quality improvements at sites currently used for the same or similar types of activities and would not substantially increase noise levels over those currently present at the project component sites. None of the four groups of project components would expose people to or generate noise levels in excess of standards established in the Oakland General Plan or applicable standards of other agencies (such as OSHA) as identified in Section IV.E.1.b, Noise Regulatory Framework. Some project groups would construct new facilities, such as the new restaurant at the Municipal Boathouse or the expanded recreational facilities at the Ira Jinkins Recreation Center, but these would not substantially increase noise or house activities that would exceed the City of Oakland's noise standards. Temporary and long-term project-related construction noise impacts are discussed in sections IV.E.2.b. (3) and (4), below.

None of the project components would create or develop any new noise sensitive land uses. None of the project components would create or develop permanent noise sources that would be incompatible with existing noise sensitive land uses (land uses would be essentially unchanged over most of the project group areas). The project would fully comply with established noise standards and the potential impact of the project on noise sensitive land uses would be less than significant.

Table IV.E-9: Summary of Potential Impacts – Noise

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Expose persons to or generate noise levels in excess of standards established in the Oakland general plan or applicable standards of other agencies?	O	O	O	O
2. Violate the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise?	O	O	O	O
3. Violate the City of Oakland Noise Ordinance regarding construction noise?	O	O	O	O
4. Violate the City of Oakland Noise regarding nuisance of persistent construction-related noise?	O/●	O	O	O
5. Create a vibration which is perceptible without instruments by the average person at or beyond any lot line containing vibration-causing activities not associated with motor vehicles, trains, and temporary construction or demolition work?	O	O	O	O
6. Generate interior L_{dn} or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities?	O	O	O	O
7. Result in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	O	O	O	O
8. Conflict with state land use compatibility guidelines for all specified land uses for determination of acceptability of noise?	O	O	O	O
9. Be located within an airport land use plan and would expose people residing or working in the project area to excessive noise levels?	O	O	O	O
10. Be located within the vicinity of a private airstrip, and would expose people residing or working in the project area to excessive noise levels?	O	O	O	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
NOISE-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

(1) Operational Noise. Project components would not violate the City of Oakland Noise Ordinance regarding operational noise. None of the project components would create or develop any new noise sensitive land uses. None of the project components would create or develop permanent noise sources that would exceed the maximum allowable receiving noise level standards for residential and civic land uses, commercial land uses, or manufacturing land uses. Therefore, the project's potential operational noise impacts on noise sensitive land uses would be less than significant.

(2) Significant Construction Noise Impacts. Project related construction noise impacts and related City standards are discussed together with the persistent construction noise impacts in Section IV.E.2.b. (4), below.

(3) Persistent Construction-Related Noise Impacts. The potential construction-related noise impacts are similar for each group as discussed below.

Lake Merritt and Lake Merritt Channel (Group 1). The proposed Lake Merritt and Lake Merritt Channel group is bordered by recreational, commercial and residential land uses. Project construction would temporarily increase noise levels on these adjacent land uses. Construction-related noise impacts would occur from worker commute trips and material deliveries and from on-site construction activities such as excavation and grading. This discussion addresses potential noise impacts to human receptors. Construction noise impacts on the Lake Merritt Channel wildlife are addressed in Section IV.F, Biological Resources.

Construction crew commutes and the transport of construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the construction site. There would be single event noise exposure potential up to 87 dBA L_{max} at 50 feet from passing trucks. This is consistent with typical noise levels generated by delivery trucks, busses, maintenance vehicles, etc. These single event noise levels would not significantly increase the ambient noise when averaged over time and would thus not exceed the maximum allowable daytime average receiving noise level standard shown in Table IV.E-5. Therefore, construction-related noise impacts associated with worker commutes and equipment transport to the project site would be less than significant.

Construction would be performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Typical equipment used during this phase would include excavating machinery such as backfillers, bulldozers, draglines and front loaders, and earthmoving and compacting equipment such as compactors, scrapers, and graders. Typical operating cycles for the construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other construction vehicles may include water and pickup trucks. Table IV.E-10 lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical noise levels range up to 91 dBA L_{max} at 50 feet during the noisiest construction phases.

As shown in Table IV.E-10, the maximum noise level generated by each earthmover on the proposed project site is anticipated to be 86 dBA L_{max} at 50 feet from the earthmover. Each bulldozer would generate 85 dBA L_{max} at 50 feet. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. With each doubling of the number of sound sources of equal strength, the noise level increases by 3 dBA (e.g., two bulldozers operating at 85 dBA yield a total noise level of 88 dBA). Assuming that each piece of construction equipment operates simultaneously, the worst case combined noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area. The closest noise sensitive receptors are the residential buildings on Lakeshore Avenue, Lakeside Drive; other sensitive receptors include the Lakeview Branch Library on El Embarcadero and Dewey Academy High School on 2nd Avenue.

Table IV.E-10: Typical Construction Equipment Noise Level

Type of Equipment	Range of Sound Levels Measured (dBA at 50 feet)	Suggested Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Cranes	79 to 86	82
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	77 to 90	85
Tractors	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Bolt, Beranek & Newman, 1987. *Noise Control for Buildings and Manufacturing Plants.*

Impact NOISE-1 (Group 1): Pile driving would generate noise levels that exceed the City's long-term construction noise standards. (LTS/S)

Construction related noise associated with pile driving at East 18th Street Pier, 12th Street bridge, 10th Street bridge, 10th Street pedestrian bridge, 7th Street bypass, and the bridge over UPRR tracks, would impact noise sensitive receptors adjacent to these areas, if noise reducing measures identified in the Conditions of Approval are not feasible at some locations. As shown in Table IV.E-10, the maximum noise level generated by a pile driver on the proposed project site is anticipated to be 93 dBA L_{max} at 50 feet from the pile driver. Sensitive receptors adjacent to these potential pile driving areas include the residential buildings along Lakeshore Avenue and 18th Street, Laney College, and the Dewey Academy High School on 2nd Avenue. The closest receptors are located within 150 feet of the proposed pile driving areas. At this distance they would be exposed to maximum noise levels due to pile driving without attenuation of up to 83.5 dBA L_{max}. At each location, pile driving would occur periodically during the construction period, sometimes for durations lasting ten working days or more; pile driving for the 12th Street bridge would take approximately 85 working days. All work would be conducted in accordance with the City's Standard and Uniformly Applied Conditions of Approval for construction noise.

The impacts from construction noise, including pile driving, would be reduced to less-than-significant levels with implementation of the City's Standard and Uniformly Applied Conditions of Approval for construction noise as described in Section IV.E1.b(3). The Conditions of Approval (Conditions 19, 20, 21, and 27) identify measures that are generally feasible. Specifically, for project components that require pile driving, the City would prepare and implement a noise reduction plan to reduce noise to

levels that are below the City's standards for construction noise at residential and commercial properties. For pile driving this includes limiting work to the hours between 8:00 a.m. and 4:00 p.m. and use of noise barriers, use of sound blankets at the site or on nearby structures, and/or implementation of other engineering and administrative measures to attain the required noise attenuation. While the City's Conditions of Approval generally are adequate to reduce construction noise including noise from extreme noise generators to less-than-significant levels, for the Lake Merritt and Lake Merritt Channel group, because pile driving would occur over a geographically extensive area with varying soil conditions for an extended period of time, not all measures may be feasible. Thus noise-reducing measures may not be feasible at all locations and it may not be possible to reduce noise to less-than-significant levels. If the measures identified within the Conditions of Approval are implemented, impacts would be less than significant. However, if measures are not feasible at some locations then this impact would significant and unavoidable. (SU)

Waterfront Trail (Group 2). Most construction elements for the Waterfront Trail group include general trail improvements, landscaping, lighting and additional signage. These improvements are not expected to generate noise levels that would cause a significant impact on adjacent noise sensitive land uses. Other aspects of improvements along the Waterfront Trail group that would impact noise sensitive land uses are described below.

Construction related noise associated with pier drilling and trail construction could impact noise sensitive receptors along the following segments of the trail and trail access: the Cryer Site; the Bridges at Park Street, Fruitvale Avenue and High Street segment; Derby Avenue to Lancaster Street; and the US Audio/Capture Technologies and Friendly Transportation Trail Connection. Construction of this portion of the proposed project is expected to require the use of pile drivers. As shown in Table IV.E-10, the maximum noise level generated by a pile driver on the proposed project site is anticipated to be 93 dBA L_{max} at 50 feet from the pile driver. The closest known noise sensitive receptors to these trail segments are the residential properties located on the northern shore of Alameda along the Oakland Inner Harbor Tidal Canal approximately 350 feet from a proposed construction site. Assuming a direct line of sight and the worst case noise level of 91 dBA L_{max}, these sensitive receptors would be exposed to noise levels up to 74.1 dBA L_{max}.

To minimize the construction noise impact for the residential land use adjacent to these trail and access segments, and to comply with the construction hours specified in the City's Noise Ordinance, the City's standard Conditions of Approval are required as described above, including Condition 27, which addresses pile driving. Compliance with the Conditions of Approval would reduce this impact to a less-than-significant level.

Recreation Facilities (Group 3). The renovations of the Studio One Art Center in North Oakland would require the use of heavy, noise producing construction equipment. Construction of the proposed project component is expected to require the use of haul trucks, front-end loaders, and pickup trucks. As shown in Table IV.E-10, the maximum noise level generated by each haul truck on the proposed project site is assumed to be 88 dBA L_{max} at 50 feet. Each front-end loader would generate 86 dBA L_{max} at 50 feet. Pickup trucks used on the proposed project site would generate 86 dBA L_{max} at 50 feet. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates as individual noise sources, the worst case combined noise level during this phase of construction would be 92 dBA L_{max} at a distance of 50 feet from an active construction area.

To minimize the construction noise impact for noise sensitive land uses adjacent to the recreation center, and to comply with the construction hours specified in the City's Noise Ordinance, the City's standard Conditions of Approval are required as described above. Compliance with the Conditions of Approval would reduce this impact to a less-than-significant level.

The East Oakland Aquatic, Sports and Recreation Complex at the Ira Jinkins Park at Edes and Jones Avenues would include a 150,000 square foot addition to and expansion of the existing Ira Jinkins Park/Recreation Center.

Construction of the proposed project component is expected to require the use of earthmovers, bulldozers, hydraulic backhoes, and haul trucks. As seen in Table IV.E-10, the maximum noise level generated by each earthmover on the proposed project site is assumed to be 86 dBA L_{max} at 50 feet from the earthmover. Each bulldozer would generate 85 dBA L_{max} at 50 feet. Hydraulic backhoes used on the proposed project site would generate 86 dBA L_{max} at 50 feet; the maximum noise level generated by each haul truck is assumed to be 88 dBA L_{max} at 50 feet from the truck. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates as individual noise sources, the worst case combined noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area.

To minimize the construction noise impact for noise sensitive land uses adjacent to the recreation center, and to comply with the construction hours specified in the City's Noise Ordinance, the City's standard Conditions of Approval are required as described above. Compliance with the Conditions of Approval would reduce this impact to a less-than-significant level.

City-wide Creeks (Group 4). Restoration of creeks would require the use of backhoes, water and pickup trucks. As shown in Table IV.E-10, the maximum noise level generated by hydraulic backhoes is anticipated to be 86 dBA L_{max} at 50 feet from the backhoe. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates as individual noise sources, the worst case combined noise level during this phase of construction would be 89 dBA L_{max} at a distance of 50 feet from an active construction area. Noise sensitive receptors adjacent to City creeks include residential land uses. To minimize the construction noise impact for noise sensitive land uses adjacent to the creeks, and to comply with the construction hours specified in the City's Noise Ordinance, the City's standard Conditions of Approval are required as described above. Compliance with the Conditions of Approval would reduce this impact to a less-than-significant level.

(4) Vibration. None of the four project groups contain components that would generate ground-borne vibration levels that would be perceptible to the average person. There would be no impact during the project's operational phase. Construction activities associated with implementation of the project, including proposed pile driving activities, could temporarily expose persons in the vicinity of the proposed project construction areas to ground-borne vibration or ground-borne noise levels. However, the project would comply with the construction hours specified in the City's Noise Ordinance and the City's standard Conditions of Approval would be applied. Implementation of the Conditions of Approval would ensure potential ground-borne vibration would be avoided or reduced to a less-than-significant level.

(5) Interior Noise. None of the four project groups would generate noise levels that would exceed the interior noise level standard of 45 dBA L_{dn} for nearby multi-family dwelling units, hotels, motels, dormitories, or long-term care facilities in the project component areas. Most measured ambient and modeled traffic noise levels for the project component areas exceed 60 dBA L_{eq} and L_{dn}. The segment of 10th Street from Oak Street to Madison Street is the only modeled roadway segment under cumulative 2025 conditions where traffic noise levels exceed 60 dBA that does not currently experience traffic noise levels that exceed 60 dBA. However, there are no existing noise sensitive receptors located adjacent to this roadway segment that do not have a form of sound-attenuating mechanical ventilation system, such as air conditioning, enabling windows to be closed for long periods of time. Based on the EPA's Protective Noise Levels (EPA 550/9-79-100, November 1978), with a combination of walls, doors, and windows, standard construction for northern California residential buildings would provide more than 25 dBA in exterior to interior noise reduction with windows closed and 15 dBA or more with windows open. Thus, with windows closed, sensitive receptors adjacent to this roadway segment would still meet the interior noise standard of 45 dBA L_{dn} (i.e., 60.6 dBA – 25 dBA = 35.6 dBA).

The Lakeview Branch Library on El Embarcadero is a potential sensitive receptor within the Lake Merritt and Lake Merritt Channel group. This building does not have a form of sound-attenuating mechanical ventilation system and would occasionally have windows open for ventilation, which would provide a noise attenuation of 15 dBA as noted above. The predicted Cumulative Plus Project traffic noise levels at 50 feet from the centerline of the outermost travel lane of this roadway segment would be up to 63.3 dBA L_{dn}. The project includes moving the travel lanes approximately 2 feet closer to the library. Under the Cumulative Plus Project Conditions, the library would be located at a distance of 82 feet from the centerline of the outermost travel lane. At this distance, the modeled Cumulative Plus Project traffic noise level would be 59 dBA L_{dn}. Thus, with windows open, the interior noise standard of 45 dBA L_{dn} would still be met (i.e., 59 dBA – 15 dBA = 44 dBA).

The proposed project would have a less-than-significant impact on interior noise levels within all project group areas.

(6) Permanent Increase in Ambient Noise Levels. Because the project renovates and constructs parks, creeks, and recreational facilities and makes improvements to water quality, it would not be a substantial source of noise during its normal operation. The primary source of ambient noise in the project area is and would be traffic noise, particularly in the area around Lake Merritt where streets would be reconfigured. The ambient noise analysis therefore examines how the future traffic patterns and flows would affect the ambient noise environment if the project were approved.

To determine future traffic noise levels the FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the Lake Merritt and Lake Merritt Channel project component. The resultant noise levels were weighed and summed over a 24-hour period in order to determine the L_{dn} values. The existing 2006 and cumulative 2025 traffic volumes for the indicated roadway segments were used in the traffic noise impact analysis. Table IV.E-11 shows the Existing Plus Project traffic noise levels adjacent to the indicated roadway segments in the Lake Merritt and Lake Merritt Channel group area. Tables IV.E-12 and IV.E-13 show the predicted Cumulative 2025 No Project and the Cumulative 2025 Plus Project traffic noise levels.

Table IV.E-11: Existing Plus Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 L_{dn} (feet)	Center-line to 65 L_{dn} (feet)	Center-line to 60 L_{dn} (feet)	L_{dn} (dBA) 50 feet from Centerline of Outermost Lane	Increase from Existing Conditions
Grand Avenue (MacArthur Boulevard to El Embarcadero)	21,800	< 50 [a]	79	167	66.1	-0.1
Grand Avenue (El Embarcadero to Euclid Avenue)	27,900	< 50	93	197	67.1	1.0
El Embarcadero (Lakeshore Avenue to Grand Avenue)	9,800	< 50	< 50	98	63.1	3.0
Lakeshore Avenue (MacArthur Boulevard to El Embarcadero)	5,600	< 50	< 50	70	60.2	-4.5
Lakeshore Avenue (El Embarcadero to Boden Way)	13,300	< 50	57	120	64.4	-1.2
Harrison Street (Grand Avenue to 20th Street)	29,500	< 50	106	208	65.6	0.0
Lakeside Drive (19th Street to 20th Street)	16,700	< 50	65	140	65.7	0.8
Lakeside Drive (14th Street to 17th Street)	9,000	< 50	< 50	93	63.0	0.8
19th Street (Lakeside Drive to Harrison Street)	1,200	< 50	< 50	< 50	54.2	0.0
Madison Street (19th Street to 17th Street)	7,400	< 50	< 50	82	61.9	0.0
17th Street (Madison Street to Lakeside Drive)	900	< 50	< 50	< 50	53.0	0.0
14th Street (Oak Street to Madison Street)	12,400	< 50	56	115	63.6	0.0
12th Street (Oak Street to Madison Street)	9,600	< 50	< 50	98	62.5	0.0
10th Street (Oak Street to Madison Street)	3,600	< 50	< 50	53	58.2	0.0
14th Street (East of Oak Street)	13,600	< 50	59	123	64.0	0.0
1st Avenue (East 16th Street to Foothill Boulevard)	23,200	< 50	82	174	66.3	1.2
12th Street (Fallon Street to Oak Street)	9,100	< 50	< 50	94	62.8	0.5
Oak Street (11th Street to 12th Street)	8,600	< 50	< 50	91	62.0	0.0
1st Avenue (East 15th Street to East 14th Street)	23,400	< 50	83	175	66.4	1.8
12th Street (3rd Avenue to 2nd Avenue)	10,900	< 50	< 50	106	63.0	0.0
2nd Avenue (12th Street to 14th Street)	6,900	< 50	< 50	78	61.8	0.0
5th Avenue (12th Street to 14th Street)	6,300	< 50	< 50	73	61.4	0.0
10th Street (4th Avenue to 2nd Avenue)	5,400	< 50	< 50	66	60.8	0.0
10th Street (2nd Avenue to Fallon Street)	5,400	< 50	< 50	66	60.8	0.0
8th Street (5th Avenue to Lake Merritt Channel)	13,300	< 50	58	121	63.9	0.0
Embarcadero East (5th Avenue to Lake Merritt Channel)	7,100	< 50	< 50	79	62.0	0.0

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
Source: LSA Associates Inc., February 2007

Table IV.E-12: Cumulative (2025) No Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 L_{dn} (feet)	Center-line to 65 L_{dn} (feet)	Center-line to 60 L_{dn} (feet)	L_{dn} (dBA) 50 feet from Centerline of Outermost Lane
Grand Avenue (MacArthur Boulevard to El Embarcadero)	24,700	< 50 [a]	86	181	66.6
Grand Avenue (El Embarcadero to Euclid Avenue)	24,900	< 50	86	182	66.6
El Embarcadero (Lakeshore Avenue to Grand Avenue)	5,400	< 50	< 50	66	60.8
Lakeshore Avenue (MacArthur Boulevard to El Embarcadero)	17,300	< 50	69	144	65.1
Lakeshore Avenue (El Embarcadero to Boden Way)	21,700	< 50	79	167	66.0
Harrison Street (Grand Avenue to 20th Street)	32,900	< 50	112	223	66.1
Lakeside Drive (19th Street to 20th Street)	18,600	< 50	72	151	65.4
Lakeside Drive (14th Street to 17th Street)	10,000	< 50	< 50	100	62.7
19th Street (Lakeside Drive to Harrison Street)	1,600	< 50	< 50	< 50	55.5
Madison Street (19th Street to 17th Street)	8,600	< 50	< 50	90	62.5
17th Street (Madison Street to Lakeside Drive)	1,200	< 50	< 50	< 50	54.2
14th Street (Oak Street to Madison Street)	18,300	< 50	71	149	65.3
12th Street (Oak Street to Madison Street)	10,600	< 50	< 50	104	62.9
10th Street (Oak Street to Madison Street)	6,200	< 50	< 50	74	60.6
14th Street (East of Oak Street)	19,700	< 50	74	156	65.6
1st Avenue (East 16th Street to Foothill Boulevard)	24,400	< 50	88	181	65.7
12th Street (Fallon Street to Oak Street)	9,900	< 50	< 50	100	62.6
Oak Street (11th Street to 12th Street)	9,900	< 50	< 50	100	62.6
1st Avenue (East 15th Street to East 14th Street)	19,400	< 50	72	154	66.0
12th Street (3rd Avenue to 2nd Avenue)	12,500	< 50	56	116	63.6
2nd Avenue (12th Street to 14th Street)	8,400	< 50	< 50	89	62.7
5th Avenue (12th Street to 14th Street)	9,700	< 50	< 50	97	63.3
10th Street (4th Avenue to 2nd Avenue)	7,600	< 50	< 50	83	62.3
10th Street (2nd Avenue to Fallon Street)	7,600	< 50	< 50	83	62.3
8th Street (5th Avenue to Lake Merritt Channel)	26,300	< 50	89	189	66.9
Embarcadero East (5th Avenue to Lake Merritt Channel)	17,800	< 50	68	145	67.0

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
Source: LSA Associates Inc., February 2007

Table IV.E-13: Cumulative (2025) Plus Project Traffic Noise Levels

Roadway Segment	ADT	Center-line to 70 L_{dn} (feet)	Center-line to 65 L_{dn} (feet)	Center-line to 60 L_{dn} (feet)	L_{dn} (dBA) 50 feet from Centerline of Outermost Lane	Increase from Cumulative No Project Conditions
Grand Avenue (MacArthur Boulevard to El Embarcadero)	23,500	< 50 [a]	83	176	66.4	-0.2
Grand Avenue (El Embarcadero to Euclid Avenue)	28,900	< 50	95	201	67.3	0.7
El Embarcadero (Lakeshore Avenue to Grand Avenue)	10,200	< 50	< 50	101	63.3	2.5
Lakeshore Avenue (MacArthur Boulevard to El Embarcadero)	6,100	< 50	< 50	73	60.5	-4.6
Lakeshore Avenue (El Embarcadero to Boden Way)	13,900	< 50	58	124	64.6	-1.4
Harrison Street (Grand Avenue to 20th Street)	31,800	< 50	110	218	66.0	-0.1
Lakeside Drive (19th Street to 20th Street)	16,600	< 50	65	139	65.6	0.2
Lakeside Drive (14th Street to 17th Street)	10,000	< 50	< 50	99	63.4	0.7
19th Street (Lakeside Drive to Harrison Street)	1,600	< 50	< 50	< 50	55.5	0.0
Madison Street (19th Street to 17th Street)	7,500	< 50	< 50	83	61.9	-0.6
17th Street (Madison Street to Lakeside Drive)	1,200	< 50	< 50	< 50	54.2	0.0
14th Street (Oak Street to Madison Street)	18,300	< 50	71	149	65.3	0.0
12th Street (Oak Street to Madison Street)	10,600	< 50	< 50	104	62.9	0.0
10th Street (Oak Street to Madison Street)	6,200	< 50	< 50	74	60.6	0.0
14th Street (East of Oak Street)	19,700	< 50	74	156	65.6	0.0
1st Avenue (East 16th Street to Foothill Boulevard)	25,600	< 50	88	186	66.8	1.1
12th Street (Fallon Street to Oak Street)	9,900	< 50	< 50	99	63.1	0.5
Oak Street (11th Street to 12th Street)	9,900	< 50	< 50	100	62.6	0.0
1st Avenue (East 15th Street to East 14th Street)	26,900	< 50	91	192	67.0	1.0
12th Street (3rd Avenue to 2nd Avenue)	9,400	< 50	< 50	97	62.4	-1.2
2nd Avenue (12th Street to 14th Street)	6,800	< 50	< 50	77	61.8	-0.9
5th Avenue (12th Street to 14th Street)	9,700	< 50	< 50	97	63.3	0.0
10th Street (4th Avenue to 2nd Avenue)	7,600	< 50	< 50	83	62.3	0.0
10th Street (2nd Avenue to Fallon Street)	7,600	< 50	< 50	83	62.3	0.0
8th Street (5th Avenue to Lake Merritt Channel)	27,800	< 50	92	196	67.1	0.2
Embarcadero East (5th Avenue to Lake Merritt Channel)	17,800	< 50	68	146	65.9	-1.1

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
Source: LSA Associates Inc., February 2007

Lake Merritt and Lake Merritt Channel (Group 1). The proposed project would change traffic patterns and roadway alignments and thus potentially increase noise levels along some roadway segments up to 2.5 dBA in 2025. This increase is well below the City's significance criterion of a 5 dBA increase or greater. Therefore, the increase in ambient noise levels resulting from implementation of the proposed project would be less than significant.

Waterfront Trail (Group 2). The project components in this group would not generate any significant increase in traffic volumes and thus would not generate any significant increase in traffic noise levels. Representative parking activities associated with the trail and adjacent parks, such as

people conversing or closing car doors, would generate approximately 60 dBA L_{max} at 50 feet. Parking lot noise would not be a significant noise issue with respect to residences adjacent to this project component.

Recreational Facilities (Group 3). The component would not generate a significant increase in traffic volumes and thus would not generate a significant increase in traffic noise levels. The operation of the East Oakland Sports Complex would potentially increase the ambient noise levels on the park property. However, the closest sensitive receptors are located over 250 feet from the facility. Due to the distance of the proposed facility from existing sensitive receptors, the potential increase in ambient sound levels would be less than significant.

City-wide Creeks (Group 4). The project would not generate an increase in ambient noise levels. These components would not generate an increase in traffic volumes and would not generate an increase in traffic noise in or adjacent to this component area.

(7) Land Use Compatibility Guidelines. The proposed project would not conflict with the State's land use compatibility guidelines related to noise. The proposed project would not create or develop any new noise sensitive land uses nor would it create or develop permanent noise sources that would be incompatible with existing noise sensitive land uses. The project would be consistent with the land use compatibility guidelines and the potential impact would be less than significant.

(8) Located Near an Airport. The project component areas are approximately 1 to 5 miles north of Oakland International Airport and 9 to 12 miles northeast of San Francisco International Airport. The project component areas experience audible aircraft noise but do not lie within the 60 dBA CNEL noise level contours of these airports; nor do they lie within an airport land use plan. Thus, the project would not expose people to excessive aircraft related noise levels and the potential impact from aircraft noise sources would be less than significant.

(9) Located Near a Private Airstrip. The nearest private airstrip is Hayward Executive Airport, located approximately 5 miles south of any of the component areas. The project component areas experience audible aircraft noise but do not lie within the 60 dBA CNEL contour lines of this or any other private airstrip. Thus, the project would not expose any persons to excessive aircraft related noise levels and the impact from aircraft noise sources associated with private airstrips would be less than significant.

c. Impacts and Mitigation Measures Unique to Specific Project Components. There are no additional unique component-specific impacts associated with noise. Project noise impacts are addressed in the preceding section.

F. BIOLOGICAL RESOURCES

This section describes the existing biological setting for the Measure DD Implementation Project components, including biological resources found at and in the vicinity of the component sites. This section also identifies potential impacts to biological resources that may result from project implementation, and suggests mitigation measures to reduce potentially significant impacts.

1. Setting

This section discusses the biological setting of the Measure DD Implementation Project, including: (1) the methods used for identifying potentially occurring special-status species within the component areas; (2) existing conditions at those component sites for which such information is available (i.e., Lake Merritt and Lake Merritt Channel group and Waterfront Trail group); and (3) applicable regulations pertaining to biological resources.

a. Methods. To determine which special-status plant and animal species could occur on or in vicinity of the Measure DD components, LSA searched the California Natural Diversity Database (CNDDB)[1] and California Native Plant Society's (CNPS) online database[2] for records of special-status species in the Oakland West and Oakland East 7.5-minute U.S. Geological Survey (USGS) quadrangles. For the purpose of this EIR, special-status species are defined as follows:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the federal Endangered Species Act (FESA)
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA)
- Plant species on Lists 1B (rare or endangered in California and elsewhere) and 2 (rare or endangered in California but more common elsewhere) in the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2006)
- Animal species designated as Species of Special Concern or Fully Protected by the California Department of Fish and Game (CDFG)
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA Guidelines

Additional sources of site-specific information include the following:

- *Lake Merritt Channel Wetlands and Widening Project Draft EIR*, CirclePoint, April 2006
- *Biological Assessment of 12th Street Reconstruction Project*, Monk & Associates, February 13, 2006
- *66th Avenue Gateway Project Biological Assessment*, Biotic Resources Group, December 8, 2005
- *Memo Re: Cryer Park Design Review*, Garcia and Associates, February 10, 2005

[1] California Natural Diversity Database (CNDDB). 2006. Special-status species occurrences from the Oakland West and Oakland East 7.5-minute USGS quadrangle. Wildlife and Habitat Data Analysis Branch, California Department of Fish and Game, Sacramento.

[2] California Native Plant Society (CNPS). 2006. Inventory of rare and endangered plants of California (online edition, v7-06b). California Native Plant Society, Sacramento. http://www.cnps.org/inventory

Field reconnaissance information for this EIR was collected during site visits to Lake Merritt and accessible portions of the Waterfront Trail by LSA biologist Matt Ricketts on January 19, 2007. The primary purpose of the site visits was to confirm existing conditions as reported in the above site-specific documents, as well as to record basic information on wildlife species present.

Plant taxonomy and nomenclature used in this EIR follows Hickman.[3] Nomenclature for common amphibians and reptiles conforms to Crother,[4] while nomenclature for mammals conforms to Baker et al.[5] Nomenclature for special-status species conforms to the CNDDB.[6] With the exception of special-status subspecies (e.g., California brown pelican), scientific names of bird species are not provided in the text since common names are standardized in the American Ornithologists' Union (AOU) *Check-list of North American Birds*.[7]

b. Existing Conditions. Existing site conditions at the Lake Merritt and Lake Merritt Channel and Waterfront Trail groups are described below. Since the remaining project groups will be evaluated at a program level and cover a large geographic area with variable site conditions (i.e., City-wide Creeks), these site descriptions are more general in scope.

(1) Lake Merritt and Lake Merritt Channel (Group 1). The discussion below pertains to project components in the general vicinity of Lake Merritt and Lake Merritt Channel (see Chapter III for the Project Description). As such, existing biological resources are described collectively for the larger Lake Merritt ecosystem rather than separately for each proposed project component (e.g., 12th Street Improvements, Lakeside Drive and El Embarcadero).

Vegetation and Habitats. Given its location near downtown Oakland, terrestrial vegetation in the vicinity of Lake Merritt consists entirely of ornamental trees and shrubs planted as landscaping in parks and public use areas. Common species include the following: coast redwood (*Sequoia sempervirens*), London planetree (*Platanus acerifolia*), Australian tea tree (*Leptospermum laevigatum*), southern magnolia (*Magnolia grandiflora*), deodar cedar (*Cedrus deodara*), Monterey pine (*Pinus radiata*), and eucalyptus (*Eucalyptus* sp.). Mature coast live oaks (*Quercus agrifolia*), a native species, form a substantial portion of the tree canopy at Lakeside Park, where several project components are proposed (e.g., Bellevue Avenue redesign). Lawns of managed turf also comprise a large portion of the uplands surrounding Lake Merritt. Several dense patches of blackberry (*Rubus*

[3] Hickman, J. C., editor. 1993. *The Jepson Manual: Higher Plants of California*. Third printing with corrections, 1996. University of California Press, Berkeley and Los Angeles. 1400 pp.

[4] Crother, B. I., J. Boundy, J. A. Campbell, K. De Queiroz, D. R. Frost, R. Highton, J. B. Iverson, P. A. Meylan, T. W. Reeder, M. E. Seidel, J. W. Sites, Jr., T. W. Taggart, S. G. Tilley, and D. B. Wake. 2000. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. Herpetological Circular 29:1–82.

[5] Baker, R. J., L. C. Bradley, R .D. Bradley, J. W. Dragoo, M. D. Engstrom, R. S. Hoffmann, C. A. Jones, F. Reid, D. W. Rice, and C. Jones. 2003. Revised checklist of North American mammals north of Mexico, 2003. Museum of Texas Tech University Occasional Papers 229.

[6] Ibid.

[7] American Ornithologists' Union (AOU). 1998. Check-list of North American birds. 7th edition. American Ornithologists' Union, Washington, D.C.

sp.) and pampas grass (*Cortaderia selloana*) are present along the shoreline of the Lake Merritt Channel south of 12th Street.

Although the majority of the Lake Merritt shoreline is comprised of man-made concrete retaining walls, riprap, or cobbled banks, a few small patches of cordgrass (*Spartina* sp.) occur in shallow areas with a mud substrate, particularly along the Lake Merritt Channel between 10th and 7th Streets. Small amounts of transitional marsh species such as saltgrass (*Distichlis spicata*) and marsh gumplant (*Grindelia stricta*) often grow between such patches and the adjacent managed turf of surrounding parklands.

Wildlife. The open water habitat of Lake Merritt and the Lake Merritt Channel supports a wide variety of waterbirds (i.e., ducks, shorebirds, and waders) throughout the year, with the largest concentrations occurring in the winter. Diving ducks such as greater and lesser scaup, bufflehead, ruddy duck, canvasback, and common goldeneye comprise the majority of the wintering ducks flocks, although dabbling ducks such as mallard, green-winged teal, and American wigeon are also regularly present. Lake Merritt is also one of the more reliable areas in the Bay Area for observing wintering Barrow's goldeneye, which is considered uncommon in California and a California Species of Special Concern.[8] Other species that spend the majority of their time roosting or foraging in the open water include the following: eared grebe, horned grebe, pied-billed grebe, California brown pelican (*Pelecanus occidentalis californicus*), double-crested cormorant, American coot, ring-billed gull, California gull, western gull, and Forster's tern. Wading birds such as great blue heron, great egret, snowy egret, and black-crowned night heron are regularly seen hunting along the shoreline or roosting atop lamp posts or trees adjacent to the lake's edge. Although not part of the project area, the islands near the Rotary Nature Center at the northern end of the lake support nesting colonies of these four heron species, as well as double-crested cormorant.[9] Shorebird use of the lake is much less prevalent than in the tidal mudflats of the nearby Oakland Estuary, but the following species occur in small numbers around the lake margins and along the Lake Merritt Channel shoreline: killdeer, greater yellowlegs, spotted sandpiper, and least sandpiper. Canada geese are year-round residents at Lake Merritt, where they are commonly seen foraging in the surrounding parklands as well as on the water. The resident breeding population is supplemented by migratory and wintering birds during the fall and winter.

The numerous ornamental trees, shrubs, and lawns in the vicinity of Lake Merritt provide habitat for a variety of terrestrial landbirds adapted to urban landscapes. Some of the more common year-round resident species include rock pigeon, mourning dove, Anna's hummingbird, black phoebe, American crow, American robin, California towhee, Brewer's blackbird, and house finch. Other species only present during the winter include ruby-crowned kinglet, cedar waxwing, yellow-rumped warbler, Townsend's warbler, and white-crowned sparrow. Taller trees around the lake and along the Lake Merritt Channel provide perch sites and potential nest sites for common raptors such as red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl. Such trees could also support Cooper's hawks, which are known to nest in Lakeside Park (see discussion under "Special-status Species" below).

[8] Cogswell, H. L. 1977. *Water Birds of California*. University of California Press, Berkeley. 399 pp.

[9] Kelly, J. P., K. Etienne, C. Strong, M. McCaustland, and M. L. Parkes. 2006. Annotated atlas and implications for the conservation of heron and egret nesting colonies in the San Francisco Bay area. Audubon Canyon Ranch Technical Report 90-3-17. Audubon Canyon Ranch, Marshall, California.

Although none were seen during the LSA site visit, several amphibian and reptiles species may also occur in the uplands surrounding Lake Merritt, many portions of which remain moist year-round due to irrigation of the lawns. Species potentially present include California slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), Pacific treefrog (*Pseudacris regilla*), western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinatus*), and gopher snake (*Pituophis melanoleucus*).

Urban-adapted mammal species that likely forage in the vicinity of the lake include eastern fox squirrel (*Sciurus niger*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), and northern raccoon (*Procyon lotor*).

Special-status Species. Based on the habitat types present at Lake Merritt, a preliminary review of the available literature, and a search of the CNDDB, LSA identified 56 special-status species (24 plants, 32 animals) that are known to occur, or have the potential to occur, in the general vicinity of the Lake. Table IV.F-1 summarizes the status and potential for occurrence of these species within the project area.

Plants. None of the 24 special-status plant species identified in the records search are expected to occur on any of the Measure DD component sites around Lake Merritt, due to a lack of suitable habitat and the extent of historical disturbance in the vicinity. Many of the species records in the CNDDB date from the late 1800's or early 1900's. Furthermore, the native habitats upon which these species depend (e.g., coastal dunes, alkali soils, serpentine outcrops) are completely absent from the Lake Merritt area due to its highly urbanized location. Thus, these species are assumed to be extirpated in the project vicinity.

Animals. Of the 32 special-status animal species listed in Table IV.F-1 as potentially occurring in the Lake Merritt area, 26 species are considered either unlikely to occur due to a lack of suitable habitat or extirpated from the vicinity. For example, although tidewater goby (*Eucyclogobius newberryi*) is historically known from Lake Merritt (last detected in 1979 as per CNDDB), the USFWS considers this species extirpated from the Lake and Moyle considers it extirpated from San Francisco Bay.[10,11] None of the federally listed anadromous (i.e., those that migrate from the ocean to freshwater streams and rivers to spawn) fish species are expected to occur in Lake Merritt or the Lake Merritt Channel due to the lack of suitable habitat components (e.g., gravel beds, riparian shading, well-oxygenated water) required by these species. Furthermore, there is a barrier to fish passage between the Bay waters of the Oakland Estuary and Lake Merritt due to the presence of the 7th Street pump station.

The remaining six special-status bird species have all been observed at or near Lake Merritt and/or the Lake Merritt Channel. These species are discussed in further detail below.

[10] Monk & Associates, Inc. 2006. Biological Assessment, Effects of Proposed 12th Street Reconstruction, Oakland, California. Prepared for City of Oakland Public Works Agency. February 13.

[11] Moyle, P. B. 2002. *Inland Fishes of California.* University of California Press, Berkeley and Los Angeles. 502 pp.

Table IV.F-1: Special-status Species Potentially Occurring in the Vicinity of Measure DD Implementation Project Sites, Oakland, California

Species	Status	Habitat	Potential for Occurrence
PLANTS			
Amsinckia lunaris Bent-flowered fiddleneck	1B	Woodland and grassland	None: no suitable habitat[a]
Arctostaphylos pallida Pallid manzanita	FT, SE, 1B	Shale or thin chert substrates in deciduous and coniferous forests and woodlands, chaparral, or coastal scrub	Low: seven of 11 known occurrences on or adjacent to Sausal Creek watershed, but unlikely at creek restoration sites due to lack of suitable substrate
Atriplex joaquiniana San Joaquin spearscale	1B	Seasonal alkali wetlands or alkali sink scrub	None: no suitable habitat; probably extirpated
Astragalus tener var. *tener* Alkali milk-vetch	1B	Alkali playas, vernal pools, and grasslands	None: no suitable habitat; probably extirpated
Chorizanthe cuspidata var. *cuspidata* San Francisco Bay spineflower	1B	Sandy soils in coastal scrub, dunes, and prairie	None: no suitable habitat; probably extirpated
Chorizanthe robusta var. *robusta* Robust spineflower	FE, 1B	Woodland, coastal dunes and scrub	None: no suitable habitat; thought to be extirpated (CNDDB)
Clarkia franciscana Presidio clarkia	FE, SE, 1B	Serpentine outcrops in grassland or scrub	Low: known to occur in the Oakland hills; serpentine occurs at some creek restoration areas.
Cordylanthus maritimus ssp. *palustris* Point Reyes bird's-beak	1B	Coastal salt marsh	None: thought to be extirpated (CNDDB)
Dirca occidentalis Western leatherwood	1B	Brushy slopes and mesic sites, mostly in mixed evergreen forest or oak woodland	Moderate: known to occur in Sausal Creek watershed
Erodium macrophyllum Round-leaved filaree	2	Clay soils in woodland and grassland	None: no suitable habitat[a]
Fritillaria liliacea Fragrant fritillary	1B	Coastal scrub, grassland, coastal prairie; mostly in serpentine soils	None: no suitable habitat
Gilia capitata ssp. *chamissonis* Dune gilia	1B	Coastal dunes, coastal scrub	None: no suitable habitat
Helianthella castanea Diablo helianthella	1B	Rocky soils in chaparral/oak woodland interface	None: no suitable habitat
Hoita strobilina Loma Prieta hoita	1B	Serpentine soils in chaparral and woodland	None: no suitable habitat[a]
Holocarpha macradenia Santa Cruz tarplant	FT, SE, 1B	Coastal prairie, grassland	None: Extirpated from counties surrounding San Francisco Bay (CDFG 2005)
Horkelia cunuata ssp. *sericea* Kellogg's horkelia	1B	Coniferous forest, coastal scrub, chaparral	None: no suitable habitat; probably extirpated
Meconella oregana Oregon meconella	1B	Coastal prairie, coastal scrub	None: no suitable habitat
Monardella villosa ssp. *globosa* Robust monardella	1B	Forest, woodland, and grassland openings	None: no suitable habitat[a]
Plagiobothrys chorisianus var. *chorisianus* Choris's popcorn-flower	1B	Chaparral, coastal scrub, coastal prairie	None: thought to be extirpated from East Bay (CNDDB)
Plagiobothrys diffusus San Francisco popcorn-flower	SE, 1B	Grassland and coastal prairie	None: no suitable habitat
Potamogeton filiformis Slender-leaved pondweed	2	Shallow, clear water of lakes and drainage channels	None: aquatic sites in project area likely too disturbed

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Sanicula maritime Adobe sanicle	SR, 1B	Meadows, seeps, grassland, chaparral, coastal prairie	None: Only known occurrence in East Bay is assumed extirpated (CNDDB)
Streptanthus albidus ssp. *peramoenus* Most beautiful jewel-flower	1B	Serpentine outcrops in chaparral, grassland, and woodland	Low: known to occur in the Oakland hills; serpentine occurs at some creek restoration areas.
Trifolium depauperatum var. *hydrophilum* Saline clover	1B	Marshes, swamps, vernal pools, and grasslands	None: only occurrence from 1883 collection
INVERTEBRATES			
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT	Native grasslands on serpentine outcrops; dependent on host plant *Plantago erectus*	None: former colonies in Oakland and San Leandro Hills extirpated due to habitat modification
FISH			
Chinook salmon (Sacramento River winter-run ESU[12]) *Oncorhynchus tshawytscha*	FE	Anadromous: spawns in Sacramento River system; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Chinook salmon (Central Valley spring-run ESU)	FT	Anadromous: spawns in Sacramento River system; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Steelhead (Central California Coast ESU) *Oncorynchus mykiss*	FT	Anadromous: spawns in coastal streams in fall and winter; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Coho salmon (Central California ESU) *Oncorhynchus kisutch*	FE	Anadromous: spawns in coastal streams in fall and winter	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Tidewater goby *Eucyclogobius newberryi*	FE, CSC	Brackish shallow lagoons and lower stream reaches with still, but not stagnant, water	None: considered extirpated from San Francisco Bay (Moyle 2002)
AMPHIBIANS			
California tiger salamander *Ambystoma californiense*	FT, CSC	Grasslands and foothills that contain small mammal burrows (for dry-season habitat) and seasonal ponds and pools (for breeding during the rainy season)	None: no suitable habitat
California red-legged frog *Rana aurora draytonii*	FT, CSC	Ponds, streams, drainages and associated uplands	Low: marginal habitat in Oakland watershed, but no recent records west of crest of Berkeley Hills (CNDDB)
Foothill yellow-legged frog *Rana boylii*	CSC	Partly shaded, shallow streams and riffles with a rocky substrate	Low: marginal habitat in Oakland watershed, but no recent records west of crest of Berkeley Hills (CNDDB)
REPTILES			
Pacific (=western) pond turtle *Actinemys marmorata*	CSC	Ponds, streams, drainages and associated uplands	Present: known from Sausal Creek watershed

[12] ESU = Evolutionarily Significant Unit. National Marine Fisheries Service (NMFS) considers an ESU a "species" under the Endangered Species Act.

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT, ST	Chaparral and sage scrub with rock outcrops and an abundance of prey species such as western fence lizard (*Sceloporus occidentalis*)	Low: suitable habitat present in upper Oakland watershed, but unlikely to occur at creek restoration sites
BIRDS			
California brown pelican *Pelecanus occidentalis californicus*	FE, SE, CFP	Coastal shorelines and bays; rarely found on fresh water	Present: known to forage and roost at Lake Merritt and adjacent to Waterfront Trail during fall-winter
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC	Nests on coastal cliffs and offshore islands, usually on ground with sloping surface; or in tall trees near water	Present: known rookery on islands near Rotary Nature Center, Lake Merritt
Barrow's goldeneye (nesting) *Bucephala islandica*	CSC	Lagoons, brackish lakes, and bays of central-northern California	Present: regularly observed at Lake Merritt and LMC in late fall/early winter
White-tailed kite (nesting) *Elanus leucurus*	CFP	Open grasslands, meadows, or marshes; requires dense-topped trees or shrubs for nesting and perching	None: no suitable habitat
Northern harrier (nesting) *Circus cyaneus*	CSC	Nests in wet meadows and marshes, forages over open grasslands and agricultural fields	None: no suitable habitat
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC	Coniferous forests and Coast Range oak woodlands. Usually nests in dense conifers or tops of live oaks.	Moderate: known to occur in upper Oakland watershed; suitable nest trees likely present at some creek restoration sites
Cooper's hawk (nesting) *Accipiter cooperi*	CSC	Woodlands, riparian habitats, and urban areas with abundant tree cover	Moderate: suitable nest trees present at most project sites
Golden eagle *Aquila chrysaetos*	CSC, CFP	Rolling foothills and mountain areas; nests in cliff-walled canyons or large trees in open areas	Low: may occasionally forage over upper Oakland watershed and Waterfront Trail; recent nest site at Round Top not located in project area
American peregrine falcon *Falco peregrinus anatum*	SE, CFP	A variety of open habitats including coastlines, mountains, marshes, bay shorelines, and urban areas; nests on cliffs, bridges, and tall buildings	Present: observed regularly near Lake Merritt in recent winters
California black rail *Laterallus jamaicensis coturniculus*	ST, CFP	Salt marshes bordering larger bays, also found in brackish and freshwater marshes	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh); may occasionally use uplands during extremely high winter tides, if present
California clapper rail *Rallus longirostris obsoletus*	FE, SE, CFP	Tidal salt marshes with sloughs and substantial cordgrass (*Spartina* sp.) cover	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh); may occasionally use uplands during extremely high winter tides, if present
California least tern *Sterna antillarum browni*	FE, SE, CFP	Sandy beaches, alkali flats, hard-pan surfaces (salt ponds)	Low: suitable foraging habitat over Bay waters in project vicinity, but no suitable nesting habitat

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Salt marsh common yellowthroat *Geothlypis trichas sinuosa*	CSC	Salt, brackish, and freshwater marshes and riparian woodlands; nests on or near ground in low vegetation	Low: only small patches of marginal habitat present; unlikely to nest in project area
Alameda song sparrow *Melospiza melodia pusillula*	CSC	Tidal salt marshes dominated by pickleweed; nests primarily in pickleweed (*Salicornia* sp.) and marsh gumplant (*Grindelia stricta*)	Present: observed at Lake Merritt Channel (LMC) and adjacent to 66th Ave Gateway; marginal nesting habitat along LMC
MAMMALS			
Alameda Island mole *Scapanus latimanus parvus*	CSC	Annual and perennial grasslands on Alameda Island	Unlikely: Project area outside species' range
Pallid bat *Antrozous pallidus*	CSC	Most common in open, arid habitats, but occurs in a wide variety of habitats	Moderate: suitable foraging habitat in Oakland watershed, but no known roosts; steel bridges along Waterfront Trail unlikely to support roosting bats
Townsend's big-eared bat *Corynorhinus townsedii*	CSC	Mesic habitats, habitat edges	Moderate: suitable foraging habitat in Oakland watershed, but no known roosts; steel bridges along Waterfront Trail unlikely to support roosting bats
Western mastiff bat *Eumops perotis*	CSC	Open, arid habitats	Low: limited habitat in Oakland watershed
Silver-haired bat *Lasionycteris noctivagans*	CSC	Coastal and montane forests; roosts in hollow trees or beneath exfoliating bark	Low: suitable habitat in Oakland watershed, but species' rarity likely precludes occurrence
Salt marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Tidal salt marshes of San Francisco Bay and its tributaries; requires tall, dense pickleweed for cover	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh), may occasionally use grasslands on project site as escape cover during high winter tides, if present
American badger *Taxidea taxus*	CSC	Grasslands and other open habitats with friable soils	Unlikely: no suitable habitat; no records later than 1930

Status Codes
FE = federally listed as endangered
FT = federally listed as threatened
SE = state-listed as endangered
ST = state-listed as threatened
SR = state-listed as rare
CSC = California Species of Special Concern
CFP = California Fully Protected Species
1B = California Native Plant Society (CNPS) List 1B: species considered rare or endangered in California and elsewhere
2 = CNPS List 2: species considered rare or endangered in California, but more common elsewhere
[a] Although marginal or suitable habitat may be present in the Oakland watershed, these species are not expected to occur at creek restoration sites, where habitat is expected to consist of riparian woodland and/or landscaped/developed.

California Brown Pelican. This species is federally and state-listed as endangered, and is also a California Fully Protected Species. As all California brown pelicans breed on the Channel Islands off the coast of southern California, all individuals observed in San Francisco Bay (including Lake Merritt) are non-breeding or immature birds.[13] Brown pelicans occur at Lake Merritt as uncommon but regularly occurring fall and winter (September through March) visitors.

Double-crested Cormorant. Double-crested cormorant is a California Species of Special Concern at its rookery sites. As mentioned above, a known nesting colony is present on the islands at the northern end of Lake Merritt. This species is known to forage year-round at Lake Merritt and is one of the more common waterbird species there, particularly at its northern end.

Barrow's Goldeneye. Barrow's goldeneye is a California Species of Special Concern, with protection of its nesting habitat of primary concern. This species is considered extirpated from most of California as a breeding species, and rare as a wintering species in the San Francisco Bay area.[14] As mentioned above, however, this species is regularly seen, albeit in small numbers, at Lake Merritt and the Lake Merritt Channel during the late fall and winter. At least three individuals were observed in the Lake Merritt Channel during the January 19, 2007 LSA reconnaissance survey.

Cooper's Hawk. Cooper's hawk is a California Species of Special Concern, with protection of its nest sites of primary concern. This species has adapted well to the urban environment and is known to nest in several central California cities, including Oakland. High nest-site availability (i.e., tall ornamental trees) and an abundant prey base (e.g., rock pigeons, mourning doves, American robins) are the primary habitat components that attract this species to urban areas. This species is known to nest in Lakeside Park, where a breeding pair has produced two young each year from 2004–2006.[15] The CNDDB also contains a 2003 nesting record of this species in the same location, which likely represents the same pair. [16] This nest is located in the vicinity of Bellevue Avenue and Children's Fairyland. The taller trees on and adjacent to other project component sites around Lake Merritt also represent potential nesting habitat for this species.

American Peregrine Falcon. This species is state-listed as endangered and also a California Fully Protected Species. Formerly federally listed as endangered, peregrines (*Falco peregrinus anatum*) have been delisted as a result of recent conservation and recovery efforts. Much of this species' recovery can be attributed to its success at nesting in large cities, where pairs are known to nest on bridges and tall buildings. Large populations of rock pigeons that typically occur in cities supply urban-nesting peregrines with an abundant prey source. Although no nests have been confirmed in the vicinity of Lake Merritt, this species has been sighted sporadically over the last few years perching on and hunting from the top of several tall buildings adjacent to the lake.[17] Except for two birds that were observed on September 30, 2006, all of these sightings have been of single birds.[18]

[13] CDFG and California Interagency Wildlife Task Group (CIWTG). 2005. California Wildlife Habitat Relationships database, version 8.1. Sacramento, California. http://www.dfg.ca.gov/whdab/html/cawildlife.html

[14] Avocet Research Associates. 2005. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Study, 2004. Prepared for the City of Berkeley, California. May 12. 41 pp.

[15] Travis Hails, Oakland resident and birder. Email correspondence with Matt Ricketts, January 25 and 26, 2007.

[16] Op. Cit.

[17] Op. Cit.

[18] Op. Cit.

Alameda Song Sparrow. Alameda song sparrow (*Melospiza melodia pusillula*) is a California Species of Special Concern, and one of three subspecies of song sparrow endemic to the tidal marshes surrounding San Francisco and San Pablo Bays. The Alameda subspecies occurs in tidal marshes from southeast Richmond in central San Francisco Bay south to Alviso in the South Bay. Alameda song sparrows occur primarily in tidal salt marshes, but may also nest or forage in other shoreline habitats such as seasonal wetlands, intertidal mudflats, and adjacent uplands.[19] A few individuals have been observed in the dense vegetation that borders portions of the Lake Merritt Channel (LSA obs.), which represents marginal nesting habitat for this species.

(2) Waterfront Trail (Group 2). The Oakland Waterfront Trail is part of the San Francisco Bay Trail, a planned 400-mile network of bicycle and hiking trails that will form a continuous ring around the Bay. The Waterfront Trail group consists of discontinuous sites along the proposed trail alignment. Because habitat conditions are similar among project component sites (LSA obs.), the existing biological resources will be described collectively for the Waterfront Trail group, which is typical of the north shoreline of the Oakland Inner Harbor.

Vegetation and Habitats. The Waterfront Trail sites are located primarily on bay fill land and most of the area is developed with very little native plant cover. Habitat types identified include shoreline habitats, non-native grassland/ruderal, landscaped or developed areas, coyote brush scrub, barren areas, and tidal marsh.

The shoreline habitats on the north side of the Oakland Inner Harbor are mostly comprised of human-made banks such as rock and concrete rip-rap, concrete retaining walls, and piers. The physical structure of rip-rap varies from recently constructed grouted rip-rap (e.g., around Estuary Park) to a loose conglomeration of concrete blocks, bricks, and other hard debris. Crevices within the rip-rap support small clumps of cordgrass (*Spartina* sp.), pickleweed (*Salicornia virginica*), and marsh gumplant. Larger cordgrass stands (i.e., at least 3 feet wide and 10 feet long) are scattered along the length of the shoreline, often growing within the tidal zone at the base of rip-rap. Other shoreline areas consist of rocks, gravel, soil, small blocks of concrete, and other debris that have eroded out of the adjacent upland fill areas. In some of these eroded fill areas, shoreline erosion has created a gradually sloping profile, allowing the establishment of small stands of cordgrass and other marsh vegetation.

Non-native grassland is characterized by a dense cover of introduced annual grasses such as Italian ryegrass (*Lolium multiflorum*), ripgut brome (*Bromus diandrus*), rabbit-foot grass (*Polypogon monspeliensis*), and Bermuda grass (*Cynodon dactylon*). Ruderal (weedy) vegetation often consists partially of non-native grasses, but also includes a large component of non-native herbaceous plants such as poison hemlock (*Conium maculatum*), bristly ox-tongue (*Picris echioides*), pampas grass (*Cortedaria jubata*), and wild radish (*Raphanus sativa*). These habitat types occur primarily at the Cryer site and 66th Avenue Gateway. The Cryer site also contains a few coyote brush (*Baccharis pilularis*) shrubs.

[19] Cogswell, H. L. 2000. Song sparrow. Pp. 374–385 *in* P. R. Olofson, editor. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project, San Francisco Regional Water Quality Control Board, Oakland, California.

Numerous buildings, warehouses, and residential structures are present within and adjacent to the Waterfront Trail area. Some buildings appear abandoned while others are currently used for storage and industrial uses. Landscaped areas consist of ornamental trees and shrubs planted around buildings and along roads (e.g., Monterey pines along Alameda Avenue), as well as existing parklands at Estuary Park and Union Point Park. The two parks also contain extensive areas of managed turf (i.e., lawns). Several large blue gum eucalyptus (*Eucalyptus globulus*), which were likely planted as landscaping, are present at the 66th Avenue Gateway site. A small patch of dense scrub dominated by coyote brush and poison hemlock is present at the 66th Avenue Gateway site. Other species present include iceplant (*Carpobrotus* sp.), French broom (*Genista monspessulanus*), sweet fennel (*Foeniculum vulgare*), olive (*Olea* sp.), Cape ivy (*Delairea odorata*), yellow sweet clover (*Melilotus indica*), yellow star-thistle (*Centaurea solstitialis*), California poppy (*Eschscholzia californica*), and quail bush (*Atriplex lentiformis*).

The Brooklyn Basin site consists of a mostly barren lot comprised of gravel, eroded asphalt, and (in some areas) sparse ruderal vegetation (poison hemlock and bristly ox-tongue). Similar conditions are present at the Cryer site, although ruderal vegetation is more prevalent.

A small portion of Damon Marsh, a tidal marsh adjacent to San Leandro Bay, extrudes into the northern portion of the 66th Avenue Gateway site. California cordgrass (*Spartina foliosa*) is the dominant plant species, with seaside arrow grass (*Triglochin maritime*), curly dock (*Rumex crispus*), jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), salt grass, and pickleweed covering smaller areas. In addition, an isolated wetland dominated by pickleweed is present at the northern end of the site, east of the Bay Trail levee. Other species present in this marsh fragment include fat hen (*Atriplex triangularis*), lady's thumb (*Polygonum persicaria*), willow weed (*Epilobium ciliatum*), salt grass, and curly dock.

Wildlife. Bird species expected to occur on and adjacent to the Waterfront Trail sites are similar to those described above for Lake Merritt, especially waterbirds. The sites' closer proximity to the open waters of the Oakland Inner Harbor results in higher numbers of shorebirds, gulls, terns, cormorants, and brown pelicans. These waters support many of the same ducks and grebe species that occur in Lake Merritt, but in somewhat lower numbers since they are more exposed to boat traffic and human activities on the adjacent shoreline. The rip-rap and eroded fill portions of the shoreline provide some habitat value to foraging wading birds (i.e., herons and egrets) and common shorebirds such as willet, spotted sandpiper, and killdeer. The shoreline adjacent to the 66th Avenue Gateway site supports a much more diverse shorebird community than the remaining portions of the shoreline, due to the large tidal mudflats, a critical foraging habitat for shorebirds. The nearby tidal marsh also supports many bird species specifically adapted to this habitat. Species observed in this area that were not encountered elsewhere along the shoreline include Virginia rail, canvasback, cinnamon teal, black-necked stilt, American avocet, western sandpiper, dunlin, dowitcher, black-bellied plover, marsh wren, salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), and Alameda song sparrow.

Landbird species expected to use the upland portions of the Waterfront Trail sites are similar to those expected around Lake Merritt, although the limited tree and shrub cover at many of the Waterfront Trail sites results in lower habitat value. Species observed during the January 19, 2007 reconnaissance survey include rock pigeon, Anna's hummingbird, black phoebe, American crow, American robin, yellow-rumped warbler, and Townsend's warbler. Other common urban-adapted

species expected to occur include California towhee, northern mockingbird, white-crowned sparrow, and house finch.

Waterfront Trail sites that contain at least some vegetative cover (e.g., 66th Avenue Gateway) are expected to support the same common, urban-adapted amphibians, reptiles, and mammals as those mentioned above for Lake Merritt. Such species are less likely to occur on barren or fully landscaped sites that lack natural or ruderal vegetation.

Special-status Species. Of the 56 special-status plant and animal species listed in Table IV.F-1, 15 animal species are considered to have some potential to occur on or adjacent to the Waterfront Trail area: chinook salmon (*Oncorhynchus tshawytscha*) (Sacramento Valley winter-run and Central Valley spring-run evolutionarily significant units [ESUs]), steelhead (*Oncorhynchus mykiss*) (central California coast ESU), coho salmon (*Oncorhynchus kisutch*) (central California ESU), California black rail (*Laterallus jamaicensis coturniculus*), California clapper rail (*Rallus longirostris obsoletus*), California least tern (*Sterna antillarum browni*), salt marsh common yellowthroat, California brown pelican, double-crested cormorant, Barrow's goldeneye, Cooper's hawk, American peregrine falcon, Alameda song sparrow, and salt marsh harvest mouse (*Reithrodontomys raviventris*). No special-status plant species are expected to occur for the same reasons provided above for Lake Merritt (i.e., history of disturbance, lack of suitable habitat).

Of the 15 above-mentioned special-status animals, only six (California brown pelican, double-crested cormorant, Cooper's hawk, American peregrine falcon, salt marsh common yellowthroat, Alameda song sparrow) have either been observed or are considered to have moderate potential to occur on or adjacent to the Waterfront Trail area. Brown pelicans (fall-winter) and double-crested cormorants (year-round) are regularly observed foraging and roosting in the Oakland Inner Harbor, although no cormorant rookery sites are present. A single peregrine falcon was seen perched atop the Fruitvale Bridge on January 21, 2007, as well as in January 2006.[20] Although there are no confirmed peregrine nest sites in the vicinity of the proposed Waterfront Trail, this species may occasionally forage along the shoreline during the winter. Cooper's hawks have not been confirmed as nesting in the area, but suitable nest trees are present at Estuary Park, along Alameda Avenue, and at the 66th Avenue Gateway site. Salt marsh common yellowthroat and Alameda song sparrow were observed and likely breed in Damon Marsh adjacent to the 66th Avenue Gateway site (LSA obs.). These two species may occasionally venture onto the site when foraging, although they are unlikely to nest there. The remainder of the Waterfront Trail area lacks tidal marsh areas of sufficient size to support either of these two species.

Other Sensitive Biological Resources. Although not identified as special-status species in the CNDDB, all native San Francisco Bay fish species are protected under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Amendments to this Act in 1996 require federal agencies to consult with the National Marine Fisheries Service regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for federally managed fish species. The Magnuson-Stevens Act defines EFH as "those areas and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The proposed Waterfront Trail is located adjacent to EFH for 83 fish species covered under the Pacific Groundfish Fishery Management Plan. This EFH includes all the waters of San Francisco Bay, below mean higher high

[20] Rauzon, M. 2007. Electronic message posted to Friends of Sausal Creek (FOSC) email listserv, January 21. http://lists.sausalcreek.org/pipermail/fosc-sausalcreek.org/2007/001057.html.

water (MHHW). Thus, any Waterfront Trail features that would be located in or over San Francisco Bay and will require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act, may be required to implement mitigation measures for impacts on EFH.

Pacific herring (*Clupea pallasi*) in San Francisco Bay are of special interest to the CDFG, because the Bay supports some of the largest spawning aggregations in California. The open waters adjacent to the Waterfront Trail, including areas under piers, could provide spawning habitat for Pacific herring. The spawning season extends from November through March, with peak activity in January.[21]

Marine mammals are also unidentified by the CNDDB as special-status species and are protected under the federal Marine Mammal Protection Act. Two species of marine mammals, harbor seal (*Phoca vitulina*) and California sea lion (*Zalophus californianus*), may occur infrequently in the Oakland Inner Harbor adjacent to the Waterfront Trail project area. It is unlikely that these species haul out regularly along the shoreline, due to the steep banks, unsuitable substrate (e.g., rip-rap, concrete banks, and piers), and high level of disturbance. If regularly used haul-out sites are identified, however, the Corps may require mitigation measures in connection with a Corps permit issued for the Waterfront Trail.

(3) Recreational Facilities (Group 3). The two components within this group are the renovation of the historic Studio One Art Center located in North Oakland and the construction of an East Oakland Sports Complex. Existing biological resources of these two areas are briefly described below.

Vegetation and Wildlife Habitat Value. Vegetation at the Studio One site is limited to a small managed turf lawn and a few ornamental trees. Similarly, vegetation at the East Oakland Recreational Center site (Ira Jinkins Community Center) consists entirely of managed turf (baseball field) and several ornamental trees planted as landscaping. Tree species present include eucalyptus, coast redwood, Monterey pine, and coast live oak.

Wildlife species expected to use these sites are similar to those urban-adapted species mentioned above for Lake Merritt, although habitat at the Studio One site is so limited that only the most common species (e.g., rock pigeon, house finch) are expected to occur there regularly. The trees at the East Oakland site (e.g., pines) have low to moderate potential to support nesting birds, including red-shouldered hawk and Cooper's hawk in the taller conifers.

Special-status Species. The only special-status species considered to have any potential to occur at either of the two sites is Cooper's hawk, for which marginal nesting habitat is present at the East Oakland site. No other special-status plant or animal species are expected to occur at the two sites due to their location within heavily urbanized portions of Oakland and consequent lack of native habitats.

(4) City-wide Creeks (Group 4). Various creeks and associated watersheds are included in the scope of Measure DD-funded creek restoration activities, but only selected locations along

[21] Tasto, R. N. 2000. Pacific herring. Pp. 81–85 *in* P. R. Olofson, editor. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project, San Francisco Regional Water Quality Control Board, Oakland, California.

Oakland creeks would be affected by Measure DD restoration activities. The description below is based on extensive biological information on Sausal Creek, collected by the Friends of Sausal Creek (FOSC), a volunteer-based organization that has been working with the City to restore the Sausal Creek watershed over the last 10 years.[22] The vegetation and habitats within the Sausal Creek watershed are likely representative of those that occur throughout the remaining portions of the Oakland watershed.

Vegetation and Habitats. Vegetation communities or habitat types potentially present include landscaped/developed, riparian woodland, oak woodland, mixed evergreen forest, redwood forest, grassland, chaparral, and coastal scrub.

Existing development within the Oakland watershed ranges from low-density residential development in the hills to a dense mix of commercial and residential uses in the lower reaches. Low-density development is characterized by buildings that are often located within or adjacent to sizeable patches of natural habitats such as mixed evergreen forest, grassland, or chaparral. Although ornamental plantings are often present along roads and within landscaped gardens, native species comprise a large portion of the vegetative cover. Landscaped/developed habitats in the lower reaches consist almost entirely of non-native ornamental trees and shrubs such as those mentioned above for Lake Merritt, with eucalyptus and Monterey pine probably being two of the more widely planted species. In many cases, ornamental species invade adjacent native habitats such as riparian woodland, often forming dense colonies and out-competing native species.

Riparian woodland refers to the assemblage of trees, shrubs, and herbaceous plants usually found growing along streams. Common trees and shrubs in this community include bigleaf maple (*Acer macrophyllum*), white alder (*Alnus rhombifolia*), box-elder (*Acer negundo*), arroyo willow (*Salix lasiolepis*), poison oak (*Toxicodendron diversilobum*), and black twinberry (*Lonicera involucrata* var. *ledebourii*). Common herbaceous species growing in riparian woodlands include willow-herb (*Epilobium ciliatum* ssp. *sericea*), western lady fern (*Athyrium filix-femina* var. *cyclosorum*), horsetail (*Equisetum* sp.), and sedge (*Carex* sp.).

Oak woodlands in this area primarily consist of well-spaced coast live oaks with few shrubs and a wide variety of herbaceous plants. Other tree species may include valley oak (*Quercus lobata*) and California bay (*Umbellularia californica*), but they are not as prevalent as coast live oak. Although there is little shrub cover, scattered patches of snowberry (*Symphoricarpos albus*) and poison oak may be present. Common herbaceous species include goldback fern (*Pentagramma triangularis* ssp. *triangularis*), mistletoe (*Phoradendron villosum*), California buttercup (*Ranunculus californicus*), and miner's lettuce (*Claytonia parviflora* ssp. *parviflora*). This community may occur on uplands adjacent to creek restoration sites.

Mixed evergreen forest refers to a variety of forest types characterized by closed-canopy stands of several kinds of broadleaved evergreen hardwoods or of hardwoods and conifers.[23] Because of

[22] Friends of Sausal Creek (FOSC). 2006. Sausal creek watershed plant communities. Prepared by Karen Paulsell. Friends of Sausal Creek, Oakland, California. January 16. http://www.sausalcreek.org/sausal/nature_pdf/-FOSC_habitat_plant_list.pdf

[23] Shuford, W. D., and I. C. Timossi. 1989. *Plant Communities of Marin County*. California Native Plant Society, Sacramento. 32 pp.

variation in slope, moisture, and elevational gradients across sites, this community varies in species composition and may grade into other communities such as oak woodland or grassland. At moister, shadier sites, California bay may form dense stands with limited to no understory, although species such as licorice fern (*Polypodium calirhiza*), western sword fern (*Polystichum munitum*), and California huckleberry (*Vaccinium ovatum*) may grow in small numbers. Other areas are co-dominated by Pacific madrone (*Arbutus menziesii*), coast live oak, and California bay. California buckeye (*Aesculus californica*) may also be an important component. Additional herbaceous species that may occur in the understory of these forests include Douglas iris (*Iris douglasiana*), thimbleberry (*Rubus parviflorus*), yerba buena (*Satureja douglasii*), and Solomon's seal (*Smilacena* sp.).

Redwood forests dominated by coast redwood are limited to steep, moist canyons in the upper reaches of Oakland watersheds. Many of the understory species that grow in oak woodlands and mixed evergreen forest can also be found in redwood forests, although species unique to this community such as salal (*Gaultheria shallon*) and redwood sorrel (*Oxalis oregano*) are also present. Grasslands are open, treeless expanses of grasses and associated herbaceous species. Many California grasslands formerly comprised of native bunchgrass species have been invaded by non-native annual grasses introduced by domestic livestock in the 1700's.[24] Common non-native grasses in the Oakland hills include wild oat (*Avena fatua*), ripgut brome, and Italian ryegrass. Native bunchgrasses documented in the Sausal Creek watershed include big squirreltail (*Elymus multisetus*), melic (*Melica* sp.), and purple needlegrass (*Nasella pulchra*). Common herbaceous species that grow in both native and non-native grasslands include blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), California plantain (*Plantago erecta*), blue-eyed grass (*Sisyrinchium bellum*), and California poppy.

Chaparral is a vegetation type in which most of the obvious components are tough-leaved evergreen shrubs that are adapted to dry habitat conditions.[25] Dominant shrubs include chamise (*Adenostoma fasciculatum*), various manzanitas (*Arctostaphylos* sp.), mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), and California coffeeberry (*Rhamnus californica*).

Coastal scrub is characterized by the presence of low shrubs intermixed with grassy meadows, and occurs within the project area on sunny hillsides.[26] Common shrub species include bush monkeyflower (*Mimulus aurantiacus*), California sagebrush (*Artemisia californica*), coyote brush, and California coffeeberry. Common herbaceous species include mugwort (*Artemisia douglasiana*), cow parsnip (*Heracleum lanatum*), bedstraw (*Galium* sp.), and bee plant (*Scrophularia californica* ssp. *californica*).

Wildlife. The diversity of habitats in the Oakland watershed results in a corresponding diversity of native wildlife species. Urban-adapted species may be present in varying amounts, depending on the proximity of urban development, but many additional species characteristic of less disturbed, more natural habitats are likely to occur. Appendix H contains tables compiled by the FOSC of birds, reptiles, amphibians, and mammals that occur or may occur in the upper Sausal Creek watershed. These species lists include most of the terrestrial wildlife species that could potentially occur in the Oakland watershed.

[24] Beidleman, L. H., and E. N. Kozloff. 2003. *Plants of the San Francisco Bay Region*. University of California Press, Berkeley and Los Angeles. 504 pp.

[25] Ibid.

[26] Op. Cit.

Rainbow trout (non-anadromous form of steelhead) are known from the Sausal Creek and Lion Creek watersheds.[27] Trout in the upper Sausal Creek watershed appear to be wild, although individuals with hatchery characteristics have been found in the population, as well. Hatchery-raised rainbow trout are present in Lake Temescal.[28] Suitable habitat upstream of Highway 13 in the Lion Creek watershed supports a small, isolated, and apparently self-sustaining population of what may be wild rainbow trout, originally derived from steelhead.[29]

Special-status Species. Of the 56 special-status species listed in Table IV.F-1, four plant and 11 animal species are either known to occur or have some potential to occur within the Oakland watershed: pallid manzanita (*Arctostaphylos pallida*), western leatherwood (*Dirca occidentalis*), Presidio clarkia (*Clarkia franciscana*), most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*), California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylii*), Pacific pond turtle (*Actinemys marmorata*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), sharp-shinned hawk, golden eagle, pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), western mastiff bat (*Eumops perotis*), silver-haired bat (*Lasionycteris noctivagans*), and Cooper's hawk.

Pallid manzanita is known to occur at the Huckleberry Botanic Preserve and in the vicinity of Manzanita Drive in the upper Sausal Creek watershed.[30] However, given its reliance on rocky ridges and outcrops in chaparral, it is highly unlikely to occur at any of the proposed creek restoration sites, which are presumably located in riparian woodland or mixed evergreen forest habitats. Western leatherwood has greater potential to occur, given that suitable habitat may be present at some of the restoration sites.

Of the 11 special-status animal species identified above, only Pacific pond turtle, sharp-shinned hawk, and Cooper's hawk are considered to have moderate potential to occur at the creek restoration sites. Although some sites may contain marginal habitat for California red-legged frog and foothill yellow-legged frog, neither of these species have been recorded west of the crest of the Berkeley and Oakland Hills. In addition, neither species was found during surveys of Sausal Creek and Arroyo Viejo conducted in 2001.[31] Alameda whipsnake is not expected to occur at any restoration sites due to its dependence on chaparral and sage scrub habitats, which are far removed from the drainage bottoms where restoration activities will occur. Pallid and Townsend's big-eared bats likely occur in the Oakland watershed, and may occasionally forage over some of the restoration sites. However, there are no known roost sites in the Oakland Hills.[32] Pacific pond turtles have been observed in the upper Sausal Creek watershed, and may occur at restoration sites where suitable habitat is present. Some of the creek restoration sites may also contain suitable nest sites for sharp-shinned and Cooper's hawks.

[27] Leidy, R. A., G. S. Becker, and B. N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, California.

[28] Personal communication with Lesley Estes, City of Oakland

[29] Ibid.

[30] Op. Cit.

[31] Personal communication with Lesley Estes, City of Oakland, April 17, 2007.

[32] Op. Cit.

c. Regulatory Context. Applicable laws and regulations pertaining to biological resources are summarized below.

(1) Federal Endangered Species Act. The Federal Endangered Species Act (FESA) protects listed species from "take," broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Any such activity can be defined as "take" even if it is unintentional or accidental. Listed plant species are typically afforded less protection than listed animals. The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over federally listed threatened and endangered plant and animal species, while the National Marine Fisheries Service (NMFS) (formerly NOAA Fisheries) has jurisdiction over all federally listed anadromous fish (i.e., salmonids).

An endangered species is one that is considered in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Federal agencies involved in permitting projects that may result in take of federally listed species (e.g., Corps) are required under Section 7 of the FESA to consult with the USFWS prior to issuing such permits. Any activity that could result in the take of a federally listed species, and is not authorized as part of a Section 7 consultation, requires a FESA Section 10 take permit from the USFWS.

(2) Clean Water Act. The U.S. Army Corps of Engineers (Corps) is responsible under Section 404 of the federal Clean Water Act to regulate the discharge of fill material into waters of the United States. Waters of the U.S. and their lateral limits are defined in 33 CFR Part 328.3(a) and include streams that are tributaries to navigable waters and their adjacent wetlands. The lateral limits of jurisdiction for a non-tidal stream are measured at the line of the Ordinary High Water Mark (OHWM) (33 CFR Part 328.3[e]) or the limit of adjacent wetlands (33 CFR Part 328.3[b]). Any permanent extension of the limits of an existing water of the U.S., whether natural or man-made, results in a similar extension of Corps jurisdiction (33 CFR Part 328.5).

Waters of the U.S. fall into two broad categories: wetlands and other waters. Other waters include waterbodies and watercourses such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands include marshes, wet meadows, seeps, floodplains, basins, and other areas experiencing extended seasonal soil saturation. Seasonally or intermittently inundated features, such as seasonal ponds, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and support wetland plant communities. Seasonally inundated waterbodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the U.S. Other waters that cannot trace a continuous hydrologic connection to a navigable water of the U.S. are not tributary to waters of the U.S. and are termed "isolated waters." Wetlands that are not adjacent to other waters are termed "isolated wetlands." ("Adjacent" means bordering, contiguous or neighboring, and includes wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like.) Isolated wetlands and waters are jurisdictional if their use, degradation, or destruction could affect interstate or foreign commerce (33 CFR Section 328.3[a]). The Corps may or may not take jurisdiction over isolated wetlands, depending on the specific circumstances.

In general, a Section 404 permit must be obtained from the Corps before filling or grading wetlands or other waters of the U.S. Certain projects may qualify for authorization under a Nationwide Permit

(NWP). The purpose of the NWP program is to streamline the evaluation and approval process throughout the nation for certain types of activities that have only minimal impacts to the aquatic environment. Many NWPs require the applicant to submit a pre-construction notification (PCN) to the appropriate Corps office and to obtain a project-specific authorization. The Corps is required to consult with the USFWS under Section 7 of the FESA if the permitted activity may result in the take of federally listed species.

All Corps permits require state water quality certification under Section 401 of the Clean Water Act. This regulatory program is administered by the San Francisco Bay Regional Water Quality Control Board (Water Board). Projects that propose to fill wetlands or other waters of the U.S. must apply for water quality certification from the Water Board. The Water Board has adopted a policy requiring mitigation for any loss of wetlands, streams, or other waters of the U.S.

(3) Porter-Cologne Water Quality Control Act. Under this Act (California Water Code Sections 13000-14920), the Water Board is authorized to regulate the discharge of waste that could affect the quality of the waters of the State. Therefore, even if a project does not require a federal permit, it may still require review and approval by the Water Board (e.g., for impacts to isolated wetlands and other waters). When reviewing applications, the Water Board focuses on ensuring that projects do not affect the "beneficial uses" associated with waters of the State. In most cases, the Water Board seeks to protect these beneficial uses by requiring the integration of water quality control measures into projects that will require discharge into waters of the State. For most construction projects, the Water Board requires the use of construction and post-construction Best Management Practices (BMPs).

(4) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to enforce this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters.

(5) California Endangered Species Act. The California Department of Fish and Game (CDFG) has jurisdiction over state-listed endangered, threatened, and rare plant and animal species under the California Endangered Species Act (CESA). In addition, species designated as "candidates" for listing under CESA are protected by its provisions. The CDFG also maintains a list of Species of Special Concern, defined as species that appear to be vulnerable to extinction because of declining populations, limited ranges, and/or continuing threats. Species of Special Concern are not afforded legal protection under CESA.

(6) California Fish and Game Code. The CDFG is also responsible for enforcing the California Fish and Game Code, which contains several provisions potentially relevant to construction projects. For example, Section 1602 of the Fish and Game Code governs the issuance of Lake and Streambed Alteration Agreements by the CDFG. Lake and Streambed Alteration Agreements are required whenever proposed project activities would substantially divert or obstruct

the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as such by the CDFG.

The Fish and Game Code also lists animal species designated as Fully Protected or Protected, which may not be taken or possessed without a permit from the Fish and Game Commission and/or the CDFG. These take permits do not allow "incidental take" and are more restrictive than the take allowed under Section 2081 of CESA. Fully Protected species are listed in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the Fish and Game Code, while Protected amphibians and reptiles are listed in Chapter 5, Sections 41 and 42.

Section 3503 of the Fish and Game Code prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks and eagles) or Strigiformes (owls) and their nests. Those provisions, along with the federal Migratory Bird Treaty Act (MBTA) (described below), essentially serve to protect nesting native birds. Non-native species, including European starling, house sparrow, and rock pigeon, are not afforded any protection under the MBTA or Fish and Game Code (except that hunting regulations apply to some non-native species).

(7) Migratory Bird Treaty Act. The MBTA prohibits the taking, hunting, killing, selling, purchasing, etc. of migratory birds, parts of migratory birds, and their eggs and nests. As used in the MBTA, the term "take" is defined as "to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires." Most bird species native to the U.S. are covered by this Act.

(8) California Environmental Quality Act. The California Environmental Quality Act (CEQA) applies to "projects" proposed to be undertaken or requiring approval by State or local government agencies. Projects are defined as having the potential to have physical impact on the environment. Under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. With sufficient documentation, a species could be shown to meet the definition of rare or endangered under CEQA and be considered a "de facto" rare or endangered species.

(9) Magnuson-Stevens Fishery Conservation and Management Act. Although not identified as special-status species in the CNDDB, all native San Francisco Bay fish species are protected under the Magnuson-Stevens Act. Amendments to this Act in 1996 require federal agencies to consult with the NMFS regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for federally managed fish species. The Magnuson-Stevens Act defines EFH as "those areas and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

(10) Marine Mammal Protection Act. All marine mammals (i.e., whales, dolphins, porpoises, seals, sea lions, and walruses) are protected by the Marine Mammal Protection Act (MMPA) of 1972. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. The MMPA is enforced by the NMFS.

(11) City of Oakland General Plan. The City has authority over land and development within city limits. The City exercises its authority through policies and planning documents such as the General Plan and City Ordinances such as the City Municipal Code. The Open Space Conservation and Recreation (OSCAR) and Land Use and Transportation Element (LUTE) of the General Plan have numerous policies related to the protection of biological resources. The primary OSCAR policies relevant to biological resources include the following:

- Policy CO-5.3: Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous material areas, improper disposal of household hazardous wastes, illicit dumping, and marina live-aboards; and (c) improve water quality in Lake Merritt to enhance the Lake's aesthetic, recreational, and ecological functions.
- Policy CO 6.1: Protect Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects which bury creeks or divert them into concrete channels.
- Policy CO-6.4: Manage Oakland's lakes to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. Discourage new recreational users which impair the ability of the lakes to support fish and wildlife. Support improvements which enhance water circulation, water quality, and habitat value, provided they are cost-effective and are compatible with established recreational activities.
- Policy CO-6.5: Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.
- Policy CO-7.1: Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.
- Policy CO-7.2: Encourage efforts to restore native plant communities in areas where they have been compromised by development or invasive species, provided that such efforts do not increase an area's susceptibility to wildfire.
- Policy CO-7.4: Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.
- Policy CO-8.1: Work with federal, state, and regional agencies on an ongoing basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.
- Policy CO-8.2: Limit recreational uses within wetland "parks" to activities that are consistent with the fragile environmental characteristics of the areas. These uses may include wildlife refuges, ecological study areas, and where appropriate, interpretive boardwalks and nature centers.
- Policy CO-9.1: Protect rare, endangered, and threatened species by conserving and enhancing their habitat and requiring mitigation of potential adverse impacts when development occurs within habitat areas.
- Policy CO-11.1: Protect wildlife from the hazards of urbanization, including loss of habitat and predation by domestic animals.
- Policy CO-11.2: Protect and enhance migratory corridors for wildlife. Where such corridors are privately owned, require new development to retain native habitat or take other measures which help sustain local wildlife populations and migratory patterns.
- Policy OS-7.4: Expand and enhance the City's waterfront park areas. Signage and access provisions to existing waterfront parks should be improved. Opportunities for new shoreline parks as depicted in Figure 7 (of the OSCAR) should be pursued as redevelopment along the waterfront occurs. A variety of park environments should be created, including active recreation areas, fishing piers and boating facilities, natural areas, and small "pocket" parks with landscaping and benches, all linked by linear parks or pedestrian paths emphasizing shoreline views and access.

- Policy OS-12.1: Incorporate a broad and varied range of tree species which is reflected on a City-maintained list of approved trees. Street tree selection should respond to the general environmental conditions at the planting site, including climate and micro-climate, soil types, topography, existing tree planting, maintenance of adequate distance between street trees and other features, the character of existing development, and the size and context of the tree planting area.
- Policy REC-2.3: Protect sensitive natural areas within parks, including creeks and woodlands, and integrate them into park design. Require new recreational facilities to respect existing park character, be compatible with the natural environment, and achieve a high standard of design quality.

The following policies from the LUTE of the General Plan are applicable to the proposed project:

- Policy W3.2: The function, design and appearance, and supplementary characteristics of all uses, activities, and facilities should enhance, and should not detract from or damage the quality of, the overall natural and built environment along the waterfront.
- Policy W3.3: Native plant communities, wildlife habitats, and sensitive habitats should be protected and enhanced.

The Oakland Estuary Plan contains the following policy relevant to biological resources:

- Policy OAK-1.1: Encourage the preservation and enhancement of wetland areas. The waterfront should be improved in a manner that maintains and enhances the ecological value of the area in general and the Lake Merritt Channel in particular. In some locations, tidelands function as tidal wetlands, providing marsh habitat for fish, migratory waterfowl, and other animals. Improvements should be encouraged that restore wetland and marsh habitat. Wetlands should be protected by such treatments as setting back trails from the shoreline, installing suitable buffer planting to prevent disruption nesting and resting areas, seasonal routing of pedestrians to avoid sensitive habitats, etc. As improvements and projects are considered, the City and Port should work with interested groups and organizations to ensure appropriate treatments along the shoreline, particularly along the channel on the eastern bank between I-880 and Embarcadero.

(12) City of Oakland Municipal Code. Title 12, Chapter 12.36 of the Oakland Municipal Code (OMC) requires that a permit be obtained prior to removing protected trees from either City or private property. Protected trees are defined as follows:

- Any coast live oak (*Quercus agrifolia*) larger than 4 inches diameter-at-breast height (dbh)
- Any tree that is larger than 9 inches dbh, except eucalyptus trees, or Monterey pines on City property and in development-related situations where more than five per acre are proposed to be removed.

(13) City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval (Standard Conditions of Approval) that would apply to the proposed project are listed below. Implementation of these conditions would ensure minimization of a project's potential impacts to biological resources.

Condition 31: Tree Removal Permit on Creekside Properties. *Prior to issuance of a final inspection of the building permit.* Prior to removal of any tree located on the project site which is identified as a creekside property, the project applicant must secure the applicable creek protection permit, and abide by the conditions of that permit.

Condition 32: Tree Removal During Breeding Season. *Prior to issuance of a tree removal permit.* To the extent feasible, removal of the trees and other vegetation suitable for nesting of raptors shall not occur during the breeding season of March 15 through August 15. If tree removal must occur during the breeding season, all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. Pre-removal surveys shall be conducted within 15 days prior to the start of work from March 15 through May 31, and within 30 days prior to the start of work from June 1 through August 15. If the survey indicates the potential presence of nesting raptors or other birds, the biologist shall determine an appropriately sized buffer around the nest in which no work will be allowed until the young have successfully fledged. The size of the nest buffer will be determined by the biologist in consultation with the CDFG, and will be based to a large extent on the nesting species and its sensitivity to disturbance. In general, buffer sizes of 200 feet for raptors and 50 feet for other birds should suffice to prevent

disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

Condition 33: Tree Removal Permit. *Prior to issuance of a demolition, grading, or building permit.* Prior to removal of any protected trees, per the Protected Tree Ordinance, located on the project site or in the public right-of-way adjacent to the project, the project applicant must secure a tree removal permit, and abide by the conditions of that permit.

Condition 34: Tree Replacement Plantings. *Prior to issuance of a final inspection of the building permit.* Replacement plantings shall be required for erosion control, groundwater replenishment, visual screening and wildlife habitat in accordance with the following criteria:

a) No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.

b) Replacement tree species shall consist of *Sequoia sempervirens* (Coast Redwood), *Quercus agrifolia* (Coast Live Oak), *Arbutus menziesii* (Madrone), *Aesculus californica* (California Buckeye) or *Umbellularia californica* (California Bay Laurel) or other tree species acceptable to the Tree Services Division.

c) Replacement trees shall be at least of 24-inch box size, unless a smaller size is recommended by the arborist, except that three 15-gallon-size trees may be substituted for each 24-inch box size tree where appropriate.

d) Minimum planting areas must be available on site as follows:

- For *Sequoia sempervirens*, three hundred fifteen square feet per tree;
- For all other species listed in #b above, seven hundred (700) square feet per tree.

e) In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee as determined by the master fee schedule of the city may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.

f) Plantings shall be installed prior to the issuance of a final inspection of building permit, subject to seasonal constraints, and shall be maintained by the project applicant until established. The Tree Reviewer may require a landscape plan showing the replacement planting and the method of irrigation. Any replacement planting which fails to become established within one year of planting shall be replanted at the project applicant's expense.

Condition 35: Tree Protection During Construction. *Prior to issuance of a demolition, grading, or building permit.* Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist:

a) Before the start of any clearing, excavation, construction or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the City Tree Reviewer. Such fences shall remain in place for duration of all such work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and other debris which will avoid injury to any protected tree.

b) Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the City Tree Reviewer from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree.

c) No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the Tree Reviewer from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the tree reviewer. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree.

d) Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration.

e) If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the Public Works Agency of such damage. If, in the professional opinion of the Tree Reviewer, such tree cannot be preserved in a healthy state, the Tree Reviewer shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed.

f) All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations.

Condition 69: Creek Protection Plan. *Prior to and ongoing throughout demolition, grading, and/or construction activities.*

a) The approved creek protection plan shall be included in the project drawings submitted for a building permit (or other construction-related permit). The project applicant shall implement the creek protection plan to minimize potential impacts to the creek during and after construction of the project. The plan shall fully describe in plan and written form all erosion, sediment, stormwater, and construction management measures to be implemented on-site.

b) If the plan includes a stormwater system, all stormwater outfalls shall include energy dissipation that slows the velocity of the water at the point of outflow to maximize infiltration and minimize erosion. The project shall not result in a substantial increase in stormwater runoff volume or velocity to the creek or storm drains.

Condition 70: Regulatory Permits and Authorizations. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* Prior to construction within the vicinity of the creek, the project applicant shall obtain all necessary regulatory permits and authorizations from the U.S Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), California Department of Fish and Game, and the City of Oakland, and shall comply with all conditions issued by applicable agencies. Required permit approvals and certifications shall include, but not be limited to the following:

a) U.S. Army Corps of Engineers (Corps): Section 404. Permit approval from the Corps shall be obtained for the placement of dredge or fill material in Waters of the U.S., if any, within the interior of the project site, pursuant to Section 404 of the federal Clean Water Act.

b) Regional Water Quality Control Board (RWQCB): Section 401 Water Quality Certification. Certification that the project will not violate state water quality standards is required before the Corps can issue a 404 permit, above.

c) California Department of Fish and Game (CDFG): Section 1602 Lake and Streambed Alteration Agreement. Work that will alter the bed or bank of a stream requires authorization from CDFG.

Condition 71: Creek Monitoring. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* A qualified geotechnical engineer and/or environmental consultant shall be retained and paid for by the project applicant to make site visits during all grading activities; and as a follow-up, submit to the Building Services Division a letter certifying that the erosion and sedimentation control measures set forth in the Creek Protection Permit submittal material have been instituted during the grading activities.

Condition 72: Creek Landscaping Plan. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* The project applicant shall develop a final detailed landscaping and irrigation plan for review and approval by the Planning and Zoning Division prepared by a licensed landscape architect or other qualified person. Such a plan shall include a planting schedule, detailing plant types and locations, and a system for temporary irrigation of plantings.

a) Plant and maintain only drought-tolerant plants on the site where appropriate as well as native and riparian plants in and adjacent to riparian corridors. Along the riparian corridor, native plants shall not be disturbed to the maximum extent feasible. Any areas disturbed along the riparian corridor shall be replanted with mature native riparian vegetation and be maintained to ensure survival.

b) All landscaping indicated on the approved landscape plan shall be installed prior to the issuance of a Final inspection of the building permit, unless bonded pursuant to the provisions of Section 17.124.50 of the Oakland Planning Code.

c) All landscaping areas shown on the approved plans shall be maintained in neat and safe conditions, and all plants shall be maintained in good growing condition and, whenever necessary replaced with new plant materials to ensure continued compliance with all applicable landscaping requirements. All paving or impervious surfaces shall occur only on approved areas.

Condition 73: Creek Dewatering and Aquatic Life. *Prior to the start of and ongoing throughout any in-water construction activity.*

a) If any dam or other artificial obstruction is constructed, maintained, or placed in operation within the stream channel, ensure that sufficient water is allowed to pass down channel at all times to maintain aquatic life (native fish, native amphibians, and western pond turtles) below the dam or other artificial obstruction.

b) The project applicant shall hire a biologist to relocate all native fish/native amphibians/western pond turtles within the work site, with all necessary State and Federal permits, prior to dewatering. Captured native fish/native amphibians/western pond turtles shall be moved to the nearest appropriate site on the stream channel downstream. The applicant shall first obtain a project-specific authorization from the CDFG and/or USFWS, as applicable, to relocate these animals. The biologist/contractor shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets, and by hand. Captured aquatic life shall be released immediately in the nearest appropriate downstream site. This condition does not allow the take or disturbance of any state- or federally listed species nor state-listed species of special concern, unless the applicant obtains a project-specific authorization from the CDFG and/or USFWS, as applicable.

2. Impacts and Mitigation Measures

This section discusses potential impacts to biological resources that could result from implementation of Measure DD. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with Measure DD and identifies mitigation measures, as appropriate.

a. Criteria of Significance. Implementation of the proposed project components would have a significant impact on biological resources if they would:

1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;

2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;

3) Have a substantial adverse effect on federally protected wetlands (as defined by Section 404 of the Clean Water Act) or state protected wetlands, through direct removal, filling, hydrological interruption, or other means;

4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

5) Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan;

6) Fundamentally conflict with the City of Oakland Tree Preservation and Removal Ordinance (OMC Chapter 12.36) by removal of protected trees under certain circumstances. Factors to be

considered in determining significance include: the number, type, size, location and condition of (a) the protected trees to be removed and/or impacted by construction and (b) the protected trees to remain, with special consideration given to native trees.[33]

Protected trees include the following:

Coast live oak measuring 4 inches dbh or larger, and any other tree measuring 9 inches dbh or larger except eucalyptus and Monterey pine; however, Monterey pine trees on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed are considered to be protected trees; or

7) Fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect biological resources. Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is substantial degradation of riparian and aquatic habitat through: (a) discharging a substantial amount of pollutants into a creek; (b) significantly modifying the natural flow of the water; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) adversely impacting the riparian corridor by significantly altering vegetation or wildlife habitat.

The level of impact to biological resources is discussed in the following section and summarized in Table IV.F-2. Many of the potential impacts will be reduced to a less-than-significant level through implementation of the City's Standard Conditions of Approval (see above), which are included as part of the project.

b. Impacts Applicable to All Project Groups. Several of the impacts to biological resources that may result from the implementation of Measure DD would essentially be the same for each or most of the four project groups. These impacts are defined below for each criterion of significance listed above. Where applicable, the City's specific Standard Conditions of Approval that will reduce potential impacts to a less-than-significant level are identified in the text after the discussion of the impact.

(1) Candidate, Sensitive, or Special-status Species. The only special-status species potentially occurring within all component groups is Cooper's hawk, a California Species of Special Concern. The numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk. In addition, some of the creek restoration sites in the upper Oakland watershed may contain suitable nest trees for sharp-shinned hawk. Both these species are California Species of Special Concern. Proposed tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-shinned hawks by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure and/or nest abandonment.

[33] Oakland Planning Code section 17.158.280E2 states that "Development related" tree removal permits are exempt from CEQA if no single tree to be removed has a dbh of 36 inches or greater **and** the cumulative trunk area of all trees to be removed does not exceed 0.1 percent of the total lot area.

Table IV.F-2: Summary of Potential Impacts – Biological Resources

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Adversely affect a candidate, sensitive or special-status species?	O	⊙ BIO-1 BIO-2	O	O
2. Adversely affect riparian habitat of other sensitive natural community?	==	==	==	O
3. Adversely affect federally or state protected wetlands?	⊙ BIO-3	⊙ BIO-3	==	⊙ BIO-3
4. Interfere with a migratory wildlife corridor or wildlife nursery site?	⊙ BIO-4	O	O	O
5. Conflict with any applicable habitat conservation plan or natural community conservation plan?	==	==	==	==
6. Conflict with the City of Oakland Tree Preservation and Removal Ordinance?	O	O	O	O
7. Conflict with the City of Oakland Creek Protection Ordinance?	O	O	==	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with Standard Conditions of Approval
⊙ Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
BIO-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-shinned hawks to a less-than-significant level. The pre-construction survey shall be conducted within 15 days prior to the start of work from March 15 though May (since there is higher potential for birds to initiate nesting during this period), and within 30 days prior to the start of work from June through August 15.

(2) Riparian Habitat. No riparian habitat or other sensitive natural communities are present at the Lake Merritt and Lake Merritt Channel or Recreational Facilities groups. A small area of pickleweed wetland, considered a sensitive natural community by the CDFG, is present on the 66th Avenue Gateway site within the Waterfront Trail group, but will not be affected by any proposed project activities. Potential impacts to wildlife that may use this plant community are discussed in Section IV.F2c. The only project group that may result in direct impacts to riparian habitat or other sensitive natural communities is the City-wide Creeks group. This potential impact is discussed in Section IV.F2c.

(3) Wetlands. Waters of the U.S. and State are present on or adjacent to several components within the Lake Merritt and the Lake Merritt Channel, Waterfront Trail, and City-wide Creeks groups. Since no such features are present within the two components of the Recreational Facilities group, this potential impact is discussed in Section IV.F2c.

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. Suitable nesting habitat for native bird species protected by the federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code is present within all of the project group areas. Additional impacts unique to the Lake Merritt Channel are discussed in Section IV.F2c.

Most existing vegetation and some un-vegetated areas within the project area have at least some potential to support breeding activities by native birds protected under the MBTA and California Fish and Game Code. Proposed removal of trees and other vegetation at Lake Merritt and the Lake Merritt Channel and potential vegetation removal for other project components (e.g., grading, clearing, and grubbing of existing landscaped areas at creek restoration sites) could directly impact nesting birds by removing vegetation that contains active nests. In addition, species that nest in un-vegetated areas (i.e., killdeer) may be vulnerable to construction activities (e.g., grading, site demolition, equipment traffic). Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting birds to a less-than-significant level.

(5) Regional Conservation Plans. The areas covered by the Measure DD Implementation Project are not currently subject to any adopted habitat conservation plans or natural community conservation plans.

(6) Protected Trees. Based on current plans, the Lake Merritt and Lake Merritt Channel group proposes to remove a number of protected trees. Protected trees might also be removed as part of the Waterfront Trail, Recreational Facilities, and City-wide Creeks groups. This impact is discussed in Section IV.F2c.

(7) Creek Protection Ordinance. Project components within the Lake Merritt and Lake Merritt Channel and City-wide Creeks groups are subject to the City's Creek Protection Ordinance. In addition, some creeks (e.g., Sausal Creek) discharge to the Oakland Harbor Channel within or adjacent to the Waterfront Trail group study area. No creeks are located on or adjacent to the site of the proposed Recreational Facilities group. This impact is discussed in Section IV.F2c.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential impacts that are unique to individual project components.

(1) Candidate, Sensitive, or Special-status Species. Potential site-specific impacts to special-status species are discussed below.

Western leatherwood and most beautiful jewel-flower, CNPS List 1B species, and Presidio clarkia, a State- and federally listed species as well as a CNPS List 1B species, are known to occur in the Oakland watershed, and suitable habitat (particularly mixed evergreen forest for western leatherwood, and serpentine for Presidio clarkia and most beautiful jewel-flower) may be present at some of the proposed creek restoration sites. Potential restoration activities that may impact these species include grading, clearing, and grubbing of landscaped areas, as well as tree pruning and removal. Surveys of

existing habitat and vegetation would be conducted during the design phase and would identify special-status plants that require protection during restoration activities and that would be incorporated into the restored site design. Other native species would be incorporated into the design to the extent feasible. Implementation of the City's Standard Conditions of Approval (Conditions 35, 70 and 72) will further ensure that any special-status plant species found at creek restoration sites will be fully protected during project activities, reducing any potential impacts to a less-than-significant level.

Pacific pond turtles, a California Species of Special Concern, are known to occur in the Oakland watershed and suitable habitat may be present at some of the creek restoration sites, depending on their level of disturbance. In-stream restoration activities (e.g., creek bed grading, creek realignment, in-stream improvements) may result in direct mortality of Pacific pond turtles if present. Implementation of the City's Standard Conditions of Approval (Condition 73) and approval of all relocation plans and involved biologists by the CDFG will reduce potential impacts to Pacific pond turtles to a less-than-significant level.

Impact BIO-1 (Group 2): Construction of an observation structure at the 66th Avenue Gateway site may impact state or federally listed tidal marsh species. (S)

Suitable habitat for California black rail, California clapper rail, and salt marsh harvest mouse (SMHM) is present in Damon Marsh adjacent to the 66th Avenue Gateway site. Construction would not extend into existing marsh habitat. A fenced buffer of upland habitat at least 20 feet wide would be set up between marsh habitat and any nearby construction areas. Nevertheless, these species are known to use grasslands and other dense vegetation adjacent to marshes as escape cover during very high tides. As such, there is a small chance that they may occur within the construction footprint during very high tides, if present in Damon Marsh. In addition, construction noise could potentially disturb nesting tidal marsh rails since suitable habitat is present within 100 feet of the construction footprint.[34]

> Mitigation Measure BIO-1a (Group 2): Ground disturbance in the vicinity of Damon Marsh shall be conducted only when high tides are not at their winter or summer extremes, to reduce the likelihood that tidal marsh rails and SMHM will be present in the construction footprint. Ground disturbance shall be avoided during the highest tides of June–July and December–January (± one week each month). (LTS)
>
> Mitigation Measure BIO-1b (Group 2): Prior to ground disturbance, a qualified biologist experienced with SMHM exclusion procedures shall prepare a site-specific SMHM avoidance plan. At a minimum, the plan shall include (1) the installation of silt fencing around the entire portion of the work area (that is within 100 feet from the edge of the marsh) to exclude SMHM from entering, (2) the clearing of all ground vegetation within the fenced area, and (3) the relocation to Damon Marsh of any SMHM found during the vegetation removal effort. Construction work shall start as soon as possible (and no longer than one week) after vegetation has been cleared. All exclusion measures and initial ground

[34] This proposed project component has been designed and the City is currently requesting bids to construct it. Mitigation included in this environmental document has been incorporated into the bid documents.

disturbance activities shall be monitored by a biologist, who has the necessary state and federal permits to handle and relocate SMHM. (LTS)

Mitigation Measure BIO-1c (Group 2): To avoid potential disturbance to nesting tidal marsh rails, construction of the observation structure shall be conducted during the non-breeding season (September 1 through January 31), unless prior surveys indicate that marsh habitat within 100 feet of the construction footprint is not part of an active rail breeding territory. Such surveys must be conducted in accordance with a project-specific survey protocol prepared in accordance with the USFWS and CDFG guidelines. (LTS)

Impact BIO-2 (Group 2): Construction of the pile-supported boardwalks along the Waterfront Trail may impact fisheries resources within the Oakland Inner Harbor. (S)

Construction of the proposed boardwalks under the bridges at Park Street, Fruitvale Avenue, and High Street has the potential to impact fisheries resources within the Oakland Inner Harbor. Specifically, pile driving activities could directly impact Pacific herring and migrating salmonids, as well as other native San Francisco Bay fish species protected under the Magnuson-Stevens Act (i.e., Essential Fish Habitat [EFH]). Pile driving can generate intense underwater sound pressure waves that may injure and kill fish.[35]

Mitigation Measure BIO-2 (Group 2): To avoid adverse impacts to Pacific herring, federally listed salmonids (chinook salmon, coho salmon, and steelhead), and EFH, pile driving shall occur within the June 1 to November 30 work window in accordance with NMFS guidelines.[36] Any pile driving occurring outside this period will require informal or formal consultation with the NMFS (for listed salmonids and EFH) and CDFG (for Pacific herring) prior to the Corps' issuance of a Section 404 permit for impacts to waters of the U.S. (LTS)

(2) Riparian Habitat. Although the proposed creek restoration activities will ultimately result in improved and increased riparian habitat throughout the Oakland watershed, short-term impacts may include removal and/or pruning of existing native riparian trees and shrubs.

Due to the programmatic level at which the City-wide Creeks project group is being evaluated, the number of existing riparian trees and/or shrubs that would be removed is unknown. However, it is anticipated that removal of some riparian vegetation would be necessary at some sites to accommodate re-grading of creek channels, bank stabilization, to allow for re-vegetation with native vegetation and other activities. Implementation of the City's Standard Conditions of Approval (Conditions 34, 69, 70, and 72) will reduce potential impacts to riparian habitat to a less-than-significant level.

(3) Wetlands. Most components within the Lake Merritt and Lake Merritt Channel group (i.e., 12th Street Reconstruction, Lakeshore Avenue/El Embarcadero, E. 18th Street Pier Overlook,

[35] Hanson, J., M. Helvey, and R. Strach, editors. 2003. Non-fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures. National Marine Fisheries Service, Alaska Region, Northwest Region, Southwest Region. August.

[36] National Marine Fisheries Service (NMFS). San Francisco Bay Project Impact Evaluation System (PIES) website. <http://mapping.orr.noaa.gov/website/portal/pies/faqs.html> Accessed April 12, 2007.

Municipal Boathouse) have already obtained the proper regulatory permits (e.g., Corps permit, Water Board water quality certification, CDFG Lake or Streambed Alteration Agreement) for actions within or adjacent to waters of the U.S. and State. Proposed activities within the Waterfront Trail and City-wide Creeks groups have yet to obtain permits for potential impacts to waters of the U.S. and State, or BCDC approval, since planning has not yet been completed for these groups.

Impact BIO-3 (Groups 1, 2, and 4): Construction of some components within the Lake Merritt and Lake Merritt Channel, Waterfront Trail, and City-wide Creeks groups may impact waters of the U.S. and State. (S)

The proposed fixed pier boardwalks at Park Street, Fruitvale Avenue, and High Street along the Waterfront Trail would involve the square-drilling or driving of concrete piers within waters of the Oakland Inner Harbor, which is under the jurisdiction of the Corps, Water Board, and BCDC as waters of the U.S. and State. In addition, proposed restoration activities within the Oakland watershed would likely result in temporary, short-term impacts to waters of the U.S. and State.

> Mitigation Measure BIO-3a (Groups 1, 2, and 4): All Measure DD-funded activities within jurisdictional waters shall first obtain authorization from the appropriate agencies (Corps, Water Board, CDFG, and BCDC). At a minimum, each activity will likely require a Section 404 Corps permit and Section 401 water quality certification from the Water Board. Creek restoration activities may also require a CDFG Lake or Streambed Alteration Agreement, depending on site-specific conditions. Construction of the fixed pier boardwalks along the Waterfront Trail will require BCDC approval since it proposes construction over and filling of Bay waters (i.e., concrete piers). (LTS)
>
> Mitigation Measure BIO-3b (Groups 1, 2, and 4): Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). If feasible, replacement habitat shall be created/preserved in the same general area as the original impact. Off-site mitigation may be approved if the amount of required replacement habitat exceeds that which is available near a given impact site. A wetland mitigation and monitoring plan (MMP) shall be developed for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s). (LTS)

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. Several species of migratory waterbirds have been observed using the Lake Merritt Channel during the winter (approximately October through March), often in flocks of 40 to 70 birds (e.g., scaup, common goldeneye). A 2004 study of waterbird use and disturbance response within Berkeley's Aquatic Park found that disturbance sensitivity was positively related to flock size, with large flocks flushing more readily than smaller ones.[37] Although no such studies have been conducted at the Lake Merritt Channel, LSA observed a flock of approximately 50 common goldeneyes swimming away from a group of schoolchildren crossing the pedestrian bridge during the January 19 site visit, indicating sensitivity to disturbance. Human-caused disturbance negatively affects wintering ducks by causing the expenditure of energy (i.e., flying or moving away from the source of

[37] Avocet Research Associates. 2005. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Study, 2004. Prepared for the City of Berkeley, California. May 12. 41 pp.

disturbance) that would otherwise be used for behaviors necessary for survival, such as resting or feeding.[38] Repeated or periodic disturbance would cause a greater expenditure of energy and thus have a greater effect on wintering birds than singular events.

Both construction activities and future recreational use of the Channel have the potential to disturb wintering waterfowl. Although most construction would occur outside of the wintering period during April through September, some may be conducted during the period when waterbirds are most abundant (approximately October through March). Construction activities at the Lake Merritt Channel (e.g., grading, demolition of existing culverts, tree removal) during this time would disturb waterbirds by causing them to fly away from loud noises and/or workers and equipment. However, because construction would occur nearly daily, except weekends, for several months the birds would likely relocate to nearby areas on Lake Merritt or the Oakland Estuary during this time rather than returning to the disturbed area. This temporary displacement of birds to nearby suitable habitat areas would be a less-than-significant impact.

Impact BIO-4 (Group 1): The introduction of small boat traffic to the Lake Merritt Channel would result in increased disturbance levels to wintering migratory ducks and other waterbirds. (S)

As discussed above, wintering ducks are sensitive to a variety of human-caused disturbances, including both motorized and non-motorized boat traffic. Based on a review of several thousand scientific journal articles and books, Korschgen and Dahlgren[39] identified four categories of human disturbance to ducks. The second-most disruptive category was defined as over-water movement with little noise (sailing, wind surfing, rowing, and canoeing). If kayaks, rowboats, and other such vessels were allowed to use the Lake Merritt Channel during the wintering period (October–March), they would create a new source of disturbance to wintering ducks and other waterbirds in the channel. Because disturbance of waterbirds by recreational users could happen multiple times each day the birds are likely to experience frequent episodes of hazing. Many of the birds would likely relocate to nearby areas on Lake Merritt or the Oakland Estuary, rather than returning to Lake Merritt Channel, thus greatly reducing the average number of waterbirds using Lake Merritt Channel. In addition, the potential disturbance would continue for the life of the project. Therefore, this impact would be significant.

> Mitigation Measure BIO-4 (Group 1): Small boat use of the Lake Merritt Channel shall be restricted to the non-wintering period of April–September, when waterbird abundance is low. During the closure period, booms shall be placed across the outlet to the Channel from Lake Merritt and at the 7th Street dam to prevent boat access and signs shall be posted indicating that the Channel is closed to recreational users. This would reduce the impact to a less-than-significant level. (LTS)

(5) Regional Conservation Plans. The area covered by the Measure DD Implementation Project is not currently subject to any adopted habitat conservation plans or natural community conservation plans.

[38] Korschgen, C. E., and R. B. Dahlgren. 1992. Human disturbances of waterfowl: causes, effects, and management. Fish and Wildlife Leaflet 13.2.15.

[39] Op. Cit.

(6) Protected Trees. In order to create additional parkland along the south shore of Lake Merritt and make other improvements around the Lake, approximately 259 trees, including 129 protected trees, would be removed and 521 new trees and other landscaping would be installed to replace them. Approximately 510 existing trees would be retained. Overall, the trees would be replaced at about a 2:1 ratio, that is, two trees would be planted for each tree removed. Table IV.F-3 summarizes proposed tree removals and new plantings by project component within the Lake Merritt and Lake Merritt Channel project group. As part of the project design process the City engaged a certified arborist to evaluate the trees proposed for removal in this group. The arborist recommended preserving five trees by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project and the numbers in Table IV.F-3 reflect the preservation of these trees. The arborist's report is provided in Appendix I.

Table IV.F-3: Proposed Tree Removals for the Lake Merritt and Lake Merritt Channel Project Group

Project Component	Trees to be Retained[a]	Trees Proposed for Removal	Protected Trees Proposed for Removal	New Trees to be Planted	Ratio of Trees Planted to Trees Removed
Lakeside Drive/Municipal Boathouse	30	20	17	65	3.25
Lakeshore Avenue/El Embarcadero	90	24	6	135	5.4
12th Street Reconstruction	50	157	90	321	2.0
Lake Merritt Channel	340	58	16	0[b]	0
TOTAL	**510**	**259**	**129[c]**	**521**	**2.0**

[a] Numbers of trees are approximate. Totals include trees recommended for preservation or relocation by the certified arborist.
[b] No new trees would be planted along the Channel because the habitat type would be converted from landscaped urban parkland to wetlands and open water.
[c] Includes eight protected oak trees.
Source: HortScience, 2007.

The City of Oakland's Tree Preservation and Removal Ordinance (OMC Chapter 12.36) requires a permit for removal of protected trees. A permit is also required if work might damage or destroy protected trees. The project would comply with the Tree Preservation and Removal Ordinance and would obtain permits for the removal of any protected trees. In addition, the City considers other factors in determining significance for purposes of CEQA including: the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, with special consideration given to native trees, as discussed below.

The majority of protected trees to be removed are located in the 12th Street reconstruction area. Although protected trees are present in this area many of the trees are in poor or fair condition (see Appendix I); are in the landscaped median strip for 12th Street that is accessible only via rarely used pedestrian underpasses; or are in small planting strips within the parking lot for the Kaiser Convention Center (see Figure III-3). Most of the trees are non-native ornamental species. When the project components around Lake Merritt are looked at as a whole, about twice as many trees are retained in the project area as would be removed and approximately two trees would be planted for each tree removed. The new trees in the 12th Street reconstruction area would be part of proposed landscaped areas that would have direct pedestrian access to Lake Merritt and surrounding civic

buildings. The four components of Group 1 (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and Lake Merritt Channel) either retain more trees than they would remove and/or plant at least twice as many new trees as would be removed (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and 12th Street Reconstruction). Eight trees to be removed are protected native oak trees.

The project would not fundamentally conflict with the City of Oakland's Tree Preservation and Removal Ordinance and would therefore be a less-than-significant impact for the following reasons: approximately twice as many trees would be retained as would be removed; removed trees would be replaced at a 2:1 ratio; the majority of trees to be removed are in poor or fair condition; and many are located in a parking lot or an inaccessible median strip. In addition, because trees are being replaced at a 2:1 ratio many benefits lost by the removal of trees, such as aesthetics, energy conservation, reductions in stormwater runoff, improvements in air quality, and capture of carbon dioxide (a greenhouse gas) would be compensated for in a few years because of the large number of new trees being planted. The impacts of removing trees and the benefits of planting new trees in the Lake Merritt and Lake Merritt Channel group were estimated quantitatively using a computer application developed by scientists at the United States Department of Agriculture (USDA) Forest Service's Pacific Southwest Research Station to assess populations of street trees.[40] The results of this study are provided in Appendix I. Because the City would comply with the Tree Preservation and Removal Ordinance, the Lake Merritt and Lake Merritt Channel project components would have a less-than-significant impact. To reach this conclusion, the City considered the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, including native trees.

A small number of protected trees may require removal as part of the Waterfront Trail, Recreational Facilities, City-wide Creeks groups or other components of the Lake Merritt group (e.g., the Cleveland Cascade). The trees would be replaced in accordance with the City's Tree Protection Ordinance and Standard Conditions of Approval (Condition 32), which would reduce the impact to a less-than-significant level.

(7) Creek Protection Ordinance. Some proposed project components within the Lake Merritt and Lake Merritt Channel, City-wide Creeks and Waterfront Trail groups would be subject to the City's Creek Protection Ordinance. These project components would comply with the requirements of the Creek Protection Ordinance and would be constructed in accordance with a Creek Protection Permit issued by the City. Creek Protection Permits have already been obtained for the Lakeshore Avenue/El Embarcadero and East 18th Street Pier Overlook project components, for example.

Proposed project activities for creek sites range from manual activities such as hand planting, tree pruning or weed abatement, which would have no or minimal impacts, to activities that use heavy machinery such as creek bed or bank grading, culvert or concrete channel alterations, and creek realignment, as noted in Section III.C.4 of the Project Description. No mitigation is needed for manual activities with minimal impacts. For those activities that involve heavy machinery or equipment to excavate or move soil, to demolish structures, or to realign stream banks or waterways,

[40] USDA Forest Service. http://www.itreetools.org/street_trees/introduction_step1.shtm.

the City's Standard Conditions of Approval (Conditions 69 through 73) would ensure compliance with the Creek Protection Ordinance and reduce impacts to a less-than-significant level.

Creek Protection Permits will include requirements to minimize erosion and sedimentation in accordance with the Manual of Standards for Erosion and Sediment Control Measures, [41] as well as the mitigation measures described in Section IV.F.2.b, above (as applicable). In addition, Creek Protection Permits will require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) and C3 requirements pursuant to Water Board requirements. With the incorporation of these requirements into project approvals, proposed project components would have a less-than-significant impact on City creeks or other areas subject to the Creek Protection Ordinance.

[41] Association of Bay Area Governments. 1995. *Manual of Standards for Erosion and Sediment Control Measures.* Second edition. Association of Bay Area Governments, Oakland, California. 422 pp.

F. BIOLOGICAL RESOURCES

This section describes the existing biological setting for the Measure DD Implementation Project components, including biological resources found at and in the vicinity of the component sites. This section also identifies potential impacts to biological resources that may result from project implementation, and suggests mitigation measures to reduce potentially significant impacts.

1. Setting

This section discusses the biological setting of the Measure DD Implementation Project, including: (1) the methods used for identifying potentially occurring special-status species within the component areas; (2) existing conditions at those component sites for which such information is available (i.e., Lake Merritt and Lake Merritt Channel group and Waterfront Trail group); and (3) applicable regulations pertaining to biological resources.

a. Methods. To determine which special-status plant and animal species could occur on or in vicinity of the Measure DD components, LSA searched the California Natural Diversity Database (CNDDB)[1] and California Native Plant Society's (CNPS) online database[2] for records of special-status species in the Oakland West and Oakland East 7.5-minute U.S. Geological Survey (USGS) quadrangles. For the purpose of this EIR, special-status species are defined as follows:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the federal Endangered Species Act (FESA)
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA)
- Plant species on Lists 1B (rare or endangered in California and elsewhere) and 2 (rare or endangered in California but more common elsewhere) in the CNPS *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2006)
- Animal species designated as Species of Special Concern or Fully Protected by the California Department of Fish and Game (CDFG)
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA Guidelines

Additional sources of site-specific information include the following:

- *Lake Merritt Channel Wetlands and Widening Project Draft EIR*, CirclePoint, April 2006
- *Biological Assessment of 12th Street Reconstruction Project*, Monk & Associates, February 13, 2006
- *66th Avenue Gateway Project Biological Assessment*, Biotic Resources Group, December 8, 2005
- *Memo Re: Cryer Park Design Review*, Garcia and Associates, February 10, 2005

[1] California Natural Diversity Database (CNDDB). 2006. Special-status species occurrences from the Oakland West and Oakland East 7.5-minute USGS quadrangle. Wildlife and Habitat Data Analysis Branch, California Department of Fish and Game, Sacramento.

[2] California Native Plant Society (CNPS). 2006. Inventory of rare and endangered plants of California (online edition, v7-06b). California Native Plant Society, Sacramento. http://www.cnps.org/inventory

Field reconnaissance information for this EIR was collected during site visits to Lake Merritt and accessible portions of the Waterfront Trail by LSA biologist Matt Ricketts on January 19, 2007. The primary purpose of the site visits was to confirm existing conditions as reported in the above site-specific documents, as well as to record basic information on wildlife species present.

Plant taxonomy and nomenclature used in this EIR follows Hickman.[3] Nomenclature for common amphibians and reptiles conforms to Crother,[4] while nomenclature for mammals conforms to Baker et al.[5] Nomenclature for special-status species conforms to the CNDDB.[6] With the exception of special-status subspecies (e.g., California brown pelican), scientific names of bird species are not provided in the text since common names are standardized in the American Ornithologists' Union (AOU) *Check-list of North American Birds*.[7]

b. Existing Conditions. Existing site conditions at the Lake Merritt and Lake Merritt Channel and Waterfront Trail groups are described below. Since the remaining project groups will be evaluated at a program level and cover a large geographic area with variable site conditions (i.e., City-wide Creeks), these site descriptions are more general in scope.

(1) Lake Merritt and Lake Merritt Channel (Group 1). The discussion below pertains to project components in the general vicinity of Lake Merritt and Lake Merritt Channel (see Chapter III for the Project Description). As such, existing biological resources are described collectively for the larger Lake Merritt ecosystem rather than separately for each proposed project component (e.g., 12th Street Improvements, Lakeside Drive and El Embarcadero).

Vegetation and Habitats. Given its location near downtown Oakland, terrestrial vegetation in the vicinity of Lake Merritt consists entirely of ornamental trees and shrubs planted as landscaping in parks and public use areas. Common species include the following: coast redwood (*Sequoia sempervirens*), London planetree (*Platanus acerifolia*), Australian tea tree (*Leptospermum laevigatum*), southern magnolia (*Magnolia grandiflora*), deodar cedar (*Cedrus deodara*), Monterey pine (*Pinus radiata*), and eucalyptus (*Eucalyptus* sp.). Mature coast live oaks (*Quercus agrifolia*), a native species, form a substantial portion of the tree canopy at Lakeside Park, where several project components are proposed (e.g., Bellevue Avenue redesign). Lawns of managed turf also comprise a large portion of the uplands surrounding Lake Merritt. Several dense patches of blackberry (*Rubus*

[3] Hickman, J. C., editor. 1993. *The Jepson Manual: Higher Plants of California*. Third printing with corrections, 1996. University of California Press, Berkeley and Los Angeles. 1400 pp.

[4] Crother, B. I., J. Boundy, J. A. Campbell, K. De Queiroz, D. R. Frost, R. Highton, J. B. Iverson, P. A. Meylan, T. W. Reeder, M. E. Seidel, J. W. Sites, Jr., T. W. Taggart, S. G. Tilley, and D. B. Wake. 2000. Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. Herpetological Circular 29:1–82.

[5] Baker, R. J., L. C. Bradley, R .D. Bradley, J. W. Dragoo, M. D. Engstrom, R. S. Hoffmann, C. A. Jones, F. Reid, D. W. Rice, and C. Jones. 2003. Revised checklist of North American mammals north of Mexico, 2003. Museum of Texas Tech University Occasional Papers 229.

[6] Ibid.

[7] American Ornithologists' Union (AOU). 1998. Check-list of North American birds. 7th edition. American Ornithologists' Union, Washington, D.C.

sp.) and pampas grass (*Cortaderia selloana*) are present along the shoreline of the Lake Merritt Channel south of 12th Street.

Although the majority of the Lake Merritt shoreline is comprised of man-made concrete retaining walls, riprap, or cobbled banks, a few small patches of cordgrass (*Spartina* sp.) occur in shallow areas with a mud substrate, particularly along the Lake Merritt Channel between 10th and 7th Streets. Small amounts of transitional marsh species such as saltgrass (*Distichlis spicata*) and marsh gumplant (*Grindelia stricta*) often grow between such patches and the adjacent managed turf of surrounding parklands.

Wildlife. The open water habitat of Lake Merritt and the Lake Merritt Channel supports a wide variety of waterbirds (i.e., ducks, shorebirds, and waders) throughout the year, with the largest concentrations occurring in the winter. Diving ducks such as greater and lesser scaup, bufflehead, ruddy duck, canvasback, and common goldeneye comprise the majority of the wintering ducks flocks, although dabbling ducks such as mallard, green-winged teal, and American wigeon are also regularly present. Lake Merritt is also one of the more reliable areas in the Bay Area for observing wintering Barrow's goldeneye, which is considered uncommon in California and a California Species of Special Concern.[8] Other species that spend the majority of their time roosting or foraging in the open water include the following: eared grebe, horned grebe, pied-billed grebe, California brown pelican (*Pelecanus occidentalis californicus*), double-crested cormorant, American coot, ring-billed gull, California gull, western gull, and Forster's tern. Wading birds such as great blue heron, great egret, snowy egret, and black-crowned night heron are regularly seen hunting along the shoreline or roosting atop lamp posts or trees adjacent to the lake's edge. Although not part of the project area, the islands near the Rotary Nature Center at the northern end of the lake support nesting colonies of these four heron species, as well as double-crested cormorant.[9] Shorebird use of the lake is much less prevalent than in the tidal mudflats of the nearby Oakland Estuary, but the following species occur in small numbers around the lake margins and along the Lake Merritt Channel shoreline: killdeer, greater yellowlegs, spotted sandpiper, and least sandpiper. Canada geese are year-round residents at Lake Merritt, where they are commonly seen foraging in the surrounding parklands as well as on the water. The resident breeding population is supplemented by migratory and wintering birds during the fall and winter.

The numerous ornamental trees, shrubs, and lawns in the vicinity of Lake Merritt provide habitat for a variety of terrestrial landbirds adapted to urban landscapes. Some of the more common year-round resident species include rock pigeon, mourning dove, Anna's hummingbird, black phoebe, American crow, American robin, California towhee, Brewer's blackbird, and house finch. Other species only present during the winter include ruby-crowned kinglet, cedar waxwing, yellow-rumped warbler, Townsend's warbler, and white-crowned sparrow. Taller trees around the lake and along the Lake Merritt Channel provide perch sites and potential nest sites for common raptors such as red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl. Such trees could also support Cooper's hawks, which are known to nest in Lakeside Park (see discussion under "Special-status Species" below).

[8] Cogswell, H. L. 1977. *Water Birds of California*. University of California Press, Berkeley. 399 pp.

[9] Kelly, J. P., K. Etienne, C. Strong, M. McCaustland, and M. L. Parkes. 2006. Annotated atlas and implications for the conservation of heron and egret nesting colonies in the San Francisco Bay area. Audubon Canyon Ranch Technical Report 90-3-17. Audubon Canyon Ranch, Marshall, California.

Although none were seen during the LSA site visit, several amphibian and reptiles species may also occur in the uplands surrounding Lake Merritt, many portions of which remain moist year-round due to irrigation of the lawns. Species potentially present include California slender salamander (*Batrachoseps attenuatus*), arboreal salamander (*Aneides lugubris*), Pacific treefrog (*Pseudacris regilla*), western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinatus*), and gopher snake (*Pituophis melanoleucus*).

Urban-adapted mammal species that likely forage in the vicinity of the lake include eastern fox squirrel (*Sciurus niger*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), and northern raccoon (*Procyon lotor*).

Special-status Species. Based on the habitat types present at Lake Merritt, a preliminary review of the available literature, and a search of the CNDDB, LSA identified 56 special-status species (24 plants, 32 animals) that are known to occur, or have the potential to occur, in the general vicinity of the Lake. Table IV.F-1 summarizes the status and potential for occurrence of these species within the project area.

Plants. None of the 24 special-status plant species identified in the records search are expected to occur on any of the Measure DD component sites around Lake Merritt, due to a lack of suitable habitat and the extent of historical disturbance in the vicinity. Many of the species records in the CNDDB date from the late 1800's or early 1900's. Furthermore, the native habitats upon which these species depend (e.g., coastal dunes, alkali soils, serpentine outcrops) are completely absent from the Lake Merritt area due to its highly urbanized location. Thus, these species are assumed to be extirpated in the project vicinity.

Animals. Of the 32 special-status animal species listed in Table IV.F-1 as potentially occurring in the Lake Merritt area, 26 species are considered either unlikely to occur due to a lack of suitable habitat or extirpated from the vicinity. For example, although tidewater goby (*Eucyclogobius newberryi*) is historically known from Lake Merritt (last detected in 1979 as per CNDDB), the USFWS considers this species extirpated from the Lake and Moyle considers it extirpated from San Francisco Bay.[10,11] None of the federally listed anadromous (i.e., those that migrate from the ocean to freshwater streams and rivers to spawn) fish species are expected to occur in Lake Merritt or the Lake Merritt Channel due to the lack of suitable habitat components (e.g., gravel beds, riparian shading, well-oxygenated water) required by these species. Furthermore, there is a barrier to fish passage between the Bay waters of the Oakland Estuary and Lake Merritt due to the presence of the 7th Street pump station.

The remaining six special-status bird species have all been observed at or near Lake Merritt and/or the Lake Merritt Channel. These species are discussed in further detail below.

[10] Monk & Associates, Inc. 2006. Biological Assessment, Effects of Proposed 12th Street Reconstruction, Oakland, California. Prepared for City of Oakland Public Works Agency. February 13.

[11] Moyle, P. B. 2002. *Inland Fishes of California.* University of California Press, Berkeley and Los Angeles. 502 pp.

Table IV.F-1: Special-status Species Potentially Occurring in the Vicinity of Measure DD Implementation Project Sites, Oakland, California

Species	Status	Habitat	Potential for Occurrence
PLANTS			
Amsinckia lunaris Bent-flowered fiddleneck	1B	Woodland and grassland	None: no suitable habitat[a]
Arctostaphylos pallida Pallid manzanita	FT, SE, 1B	Shale or thin chert substrates in deciduous and coniferous forests and woodlands, chaparral, or coastal scrub	Low: seven of 11 known occurrences on or adjacent to Sausal Creek watershed, but unlikely at creek restoration sites due to lack of suitable substrate
Atriplex joaquiniana San Joaquin spearscale	1B	Seasonal alkali wetlands or alkali sink scrub	None: no suitable habitat; probably extirpated
Astragalus tener var. *tener* Alkali milk-vetch	1B	Alkali playas, vernal pools, and grasslands	None: no suitable habitat; probably extirpated
Chorizanthe cuspidata var. *cuspidata* San Francisco Bay spineflower	1B	Sandy soils in coastal scrub, dunes, and prairie	None: no suitable habitat; probably extirpated
Chorizanthe robusta var. *robusta* Robust spineflower	FE, 1B	Woodland, coastal dunes and scrub	None: no suitable habitat; thought to be extirpated (CNDDB)
Clarkia franciscana Presidio clarkia	FE, SE, 1B	Serpentine outcrops in grassland or scrub	Low: known to occur in the Oakland hills; serpentine occurs at some creek restoration areas.
Cordylanthus maritimus ssp. *palustris* Point Reyes bird's-beak	1B	Coastal salt marsh	None: thought to be extirpated (CNDDB)
Dirca occidentalis Western leatherwood	1B	Brushy slopes and mesic sites, mostly in mixed evergreen forest or oak woodland	Moderate: known to occur in Sausal Creek watershed
Erodium macrophyllum Round-leaved filaree	2	Clay soils in woodland and grassland	None: no suitable habitat[a]
Fritillaria liliacea Fragrant fritillary	1B	Coastal scrub, grassland, coastal prairie; mostly in serpentine soils	None: no suitable habitat
Gilia capitata ssp. *chamissonis* Dune gilia	1B	Coastal dunes, coastal scrub	None: no suitable habitat
Helianthella castanea Diablo helianthella	1B	Rocky soils in chaparral/oak woodland interface	None: no suitable habitat
Hoita strobilina Loma Prieta hoita	1B	Serpentine soils in chaparral and woodland	None: no suitable habitat[a]
Holocarpha macradenia Santa Cruz tarplant	FT, SE, 1B	Coastal prairie, grassland	None: Extirpated from counties surrounding San Francisco Bay (CDFG 2005)
Horkelia cunuata ssp. *sericea* Kellogg's horkelia	1B	Coniferous forest, coastal scrub, chaparral	None: no suitable habitat; probably extirpated
Meconella oregana Oregon meconella	1B	Coastal prairie, coastal scrub	None: no suitable habitat
Monardella villosa ssp. *globosa* Robust monardella	1B	Forest, woodland, and grassland openings	None: no suitable habitat[a]
Plagiobothrys chorisianus var. *chorisianus* Choris's popcorn-flower	1B	Chaparral, coastal scrub, coastal prairie	None: thought to be extirpated from East Bay (CNDDB)
Plagiobothrys diffusus San Francisco popcorn-flower	SE, 1B	Grassland and coastal prairie	None: no suitable habitat
Potamogeton filiformis Slender-leaved pondweed	2	Shallow, clear water of lakes and drainage channels	None: aquatic sites in project area likely too disturbed

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Sanicula maritime Adobe sanicle	SR, 1B	Meadows, seeps, grassland, chaparral, coastal prairie	None: Only known occurrence in East Bay is assumed extirpated (CNDDB)
Streptanthus albidus ssp. *peramoenus* Most beautiful jewel-flower	1B	Serpentine outcrops in chaparral, grassland, and woodland	Low: known to occur in the Oakland hills; serpentine occurs at some creek restoration areas.
Trifolium depauperatum var. *hydrophilum* Saline clover	1B	Marshes, swamps, vernal pools, and grasslands	None: only occurrence from 1883 collection
INVERTEBRATES			
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT	Native grasslands on serpentine outcrops; dependent on host plant *Plantago erectus*	None: former colonies in Oakland and San Leandro Hills extirpated due to habitat modification
FISH			
Chinook salmon (Sacramento River winter-run ESU[12]) *Oncorhynchus tshawytscha*	FE	Anadromous: spawns in Sacramento River system; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Chinook salmon (Central Valley spring-run ESU)	FT	Anadromous: spawns in Sacramento River system; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Steelhead (Central California Coast ESU) *Oncorynchus mykiss*	FT	Anadromous: spawns in coastal streams in fall and winter; occurs in small numbers in Central Bay	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Coho salmon (Central California ESU) *Oncorhynchus kisutch*	FE	Anadromous: spawns in coastal streams in fall and winter	Low: possible occasional visitor to Bay waters adjacent to Waterfront Trail
Tidewater goby *Eucyclogobius newberryi*	FE, CSC	Brackish shallow lagoons and lower stream reaches with still, but not stagnant, water	None: considered extirpated from San Francisco Bay (Moyle 2002)
AMPHIBIANS			
California tiger salamander *Ambystoma californiense*	FT, CSC	Grasslands and foothills that contain small mammal burrows (for dry-season habitat) and seasonal ponds and pools (for breeding during the rainy season)	None: no suitable habitat
California red-legged frog *Rana aurora draytonii*	FT, CSC	Ponds, streams, drainages and associated uplands	Low: marginal habitat in Oakland watershed, but no recent records west of crest of Berkeley Hills (CNDDB)
Foothill yellow-legged frog *Rana boylii*	CSC	Partly shaded, shallow streams and riffles with a rocky substrate	Low: marginal habitat in Oakland watershed, but no recent records west of crest of Berkeley Hills (CNDDB)
REPTILES			
Pacific (=western) pond turtle *Actinemys marmorata*	CSC	Ponds, streams, drainages and associated uplands	Present: known from Sausal Creek watershed

[12] ESU = Evolutionarily Significant Unit. National Marine Fisheries Service (NMFS) considers an ESU a "species" under the Endangered Species Act.

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT, ST	Chaparral and sage scrub with rock outcrops and an abundance of prey species such as western fence lizard (*Sceloporus occidentalis*)	Low: suitable habitat present in upper Oakland watershed, but unlikely to occur at creek restoration sites
BIRDS			
California brown pelican *Pelecanus occidentalis californicus*	FE, SE, CFP	Coastal shorelines and bays; rarely found on fresh water	Present: known to forage and roost at Lake Merritt and adjacent to Waterfront Trail during fall-winter
Double-crested cormorant (rookery) *Phalacrocorax auritus*	CSC	Nests on coastal cliffs and offshore islands, usually on ground with sloping surface; or in tall trees near water	Present: known rookery on islands near Rotary Nature Center, Lake Merritt
Barrow's goldeneye (nesting) *Bucephala islandica*	CSC	Lagoons, brackish lakes, and bays of central-northern California	Present: regularly observed at Lake Merritt and LMC in late fall/early winter
White-tailed kite (nesting) *Elanus leucurus*	CFP	Open grasslands, meadows, or marshes; requires dense-topped trees or shrubs for nesting and perching	None: no suitable habitat
Northern harrier (nesting) *Circus cyaneus*	CSC	Nests in wet meadows and marshes, forages over open grasslands and agricultural fields	None: no suitable habitat
Sharp-shinned hawk (nesting) *Accipiter striatus*	CSC	Coniferous forests and Coast Range oak woodlands. Usually nests in dense conifers or tops of live oaks.	Moderate: known to occur in upper Oakland watershed; suitable nest trees likely present at some creek restoration sites
Cooper's hawk (nesting) *Accipiter cooperi*	CSC	Woodlands, riparian habitats, and urban areas with abundant tree cover	Moderate: suitable nest trees present at most project sites
Golden eagle *Aquila chrysaetos*	CSC, CFP	Rolling foothills and mountain areas; nests in cliff-walled canyons or large trees in open areas	Low: may occasionally forage over upper Oakland watershed and Waterfront Trail; recent nest site at Round Top not located in project area
American peregrine falcon *Falco peregrinus anatum*	SE, CFP	A variety of open habitats including coastlines, mountains, marshes, bay shorelines, and urban areas; nests on cliffs, bridges, and tall buildings	Present: observed regularly near Lake Merritt in recent winters
California black rail *Laterallus jamaicensis coturniculus*	ST, CFP	Salt marshes bordering larger bays, also found in brackish and freshwater marshes	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh); may occasionally use uplands during extremely high winter tides, if present
California clapper rail *Rallus longirostris obsoletus*	FE, SE, CFP	Tidal salt marshes with sloughs and substantial cordgrass (*Spartina* sp.) cover	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh); may occasionally use uplands during extremely high winter tides, if present
California least tern *Sterna antillarum browni*	FE, SE, CFP	Sandy beaches, alkali flats, hard-pan surfaces (salt ponds)	Low: suitable foraging habitat over Bay waters in project vicinity, but no suitable nesting habitat

Table IV.F-1 *Continued*

Species	Status	Habitat	Potential for Occurrence
Salt marsh common yellowthroat *Geothlypis trichas sinuosa*	CSC	Salt, brackish, and freshwater marshes and riparian woodlands; nests on or near ground in low vegetation	Low: only small patches of marginal habitat present; unlikely to nest in project area
Alameda song sparrow *Melospiza melodia pusillula*	CSC	Tidal salt marshes dominated by pickleweed; nests primarily in pickleweed (*Salicornia* sp.) and marsh gumplant (*Grindelia stricta*)	Present: observed at Lake Merritt Channel (LMC) and adjacent to 66th Ave Gateway; marginal nesting habitat along LMC
MAMMALS			
Alameda Island mole *Scapanus latimanus parvus*	CSC	Annual and perennial grasslands on Alameda Island	Unlikely: Project area outside species' range
Pallid bat *Antrozous pallidus*	CSC	Most common in open, arid habitats, but occurs in a wide variety of habitats	Moderate: suitable foraging habitat in Oakland watershed, but no known roosts; steel bridges along Waterfront Trail unlikely to support roosting bats
Townsend's big-eared bat *Corynorhinus townsedii*	CSC	Mesic habitats, habitat edges	Moderate: suitable foraging habitat in Oakland watershed, but no known roosts; steel bridges along Waterfront Trail unlikely to support roosting bats
Western mastiff bat *Eumops perotis*	CSC	Open, arid habitats	Low: limited habitat in Oakland watershed
Silver-haired bat *Lasionycteris noctivagans*	CSC	Coastal and montane forests; roosts in hollow trees or beneath exfoliating bark	Low: suitable habitat in Oakland watershed, but species' rarity likely precludes occurrence
Salt marsh harvest mouse *Reithrodontomys raviventris*	FE, SE, CFP	Tidal salt marshes of San Francisco Bay and its tributaries; requires tall, dense pickleweed for cover	Low: suitable habitat adjacent to 66th Ave Gateway (Damon Marsh), may occasionally use grasslands on project site as escape cover during high winter tides, if present
American badger *Taxidea taxus*	CSC	Grasslands and other open habitats with friable soils	Unlikely: no suitable habitat; no records later than 1930

Status Codes
FE = federally listed as endangered
FT = federally listed as threatened
SE = state-listed as endangered
ST = state-listed as threatened
SR = state-listed as rare
CSC = California Species of Special Concern
CFP = California Fully Protected Species
1B = California Native Plant Society (CNPS) List 1B: species considered rare or endangered in California and elsewhere
2 = CNPS List 2: species considered rare or endangered in California, but more common elsewhere
[a] Although marginal or suitable habitat may be present in the Oakland watershed, these species are not expected to occur at creek restoration sites, where habitat is expected to consist of riparian woodland and/or landscaped/developed.

California Brown Pelican. This species is federally and state-listed as endangered, and is also a California Fully Protected Species. As all California brown pelicans breed on the Channel Islands off the coast of southern California, all individuals observed in San Francisco Bay (including Lake Merritt) are non-breeding or immature birds.[13] Brown pelicans occur at Lake Merritt as uncommon but regularly occurring fall and winter (September through March) visitors.

Double-crested Cormorant. Double-crested cormorant is a California Species of Special Concern at its rookery sites. As mentioned above, a known nesting colony is present on the islands at the northern end of Lake Merritt. This species is known to forage year-round at Lake Merritt and is one of the more common waterbird species there, particularly at its northern end.

Barrow's Goldeneye. Barrow's goldeneye is a California Species of Special Concern, with protection of its nesting habitat of primary concern. This species is considered extirpated from most of California as a breeding species, and rare as a wintering species in the San Francisco Bay area.[14] As mentioned above, however, this species is regularly seen, albeit in small numbers, at Lake Merritt and the Lake Merritt Channel during the late fall and winter. At least three individuals were observed in the Lake Merritt Channel during the January 19, 2007 LSA reconnaissance survey.

Cooper's Hawk. Cooper's hawk is a California Species of Special Concern, with protection of its nest sites of primary concern. This species has adapted well to the urban environment and is known to nest in several central California cities, including Oakland. High nest-site availability (i.e., tall ornamental trees) and an abundant prey base (e.g., rock pigeons, mourning doves, American robins) are the primary habitat components that attract this species to urban areas. This species is known to nest in Lakeside Park, where a breeding pair has produced two young each year from 2004–2006.[15] The CNDDB also contains a 2003 nesting record of this species in the same location, which likely represents the same pair. [16] This nest is located in the vicinity of Bellevue Avenue and Children's Fairyland. The taller trees on and adjacent to other project component sites around Lake Merritt also represent potential nesting habitat for this species.

American Peregrine Falcon. This species is state-listed as endangered and also a California Fully Protected Species. Formerly federally listed as endangered, peregrines (*Falco peregrinus anatum*) have been delisted as a result of recent conservation and recovery efforts. Much of this species' recovery can be attributed to its success at nesting in large cities, where pairs are known to nest on bridges and tall buildings. Large populations of rock pigeons that typically occur in cities supply urban-nesting peregrines with an abundant prey source. Although no nests have been confirmed in the vicinity of Lake Merritt, this species has been sighted sporadically over the last few years perching on and hunting from the top of several tall buildings adjacent to the lake.[17] Except for two birds that were observed on September 30, 2006, all of these sightings have been of single birds.[18]

[13] CDFG and California Interagency Wildlife Task Group (CIWTG). 2005. California Wildlife Habitat Relationships database, version 8.1. Sacramento, California. http://www.dfg.ca.gov/whdab/html/cawildlife.html

[14] Avocet Research Associates. 2005. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Study, 2004. Prepared for the City of Berkeley, California. May 12. 41 pp.

[15] Travis Hails, Oakland resident and birder. Email correspondence with Matt Ricketts, January 25 and 26, 2007.

[16] Op. Cit.

[17] Op. Cit.

[18] Op. Cit.

Alameda Song Sparrow. Alameda song sparrow (*Melospiza melodia pusillula*) is a California Species of Special Concern, and one of three subspecies of song sparrow endemic to the tidal marshes surrounding San Francisco and San Pablo Bays. The Alameda subspecies occurs in tidal marshes from southeast Richmond in central San Francisco Bay south to Alviso in the South Bay. Alameda song sparrows occur primarily in tidal salt marshes, but may also nest or forage in other shoreline habitats such as seasonal wetlands, intertidal mudflats, and adjacent uplands.[19] A few individuals have been observed in the dense vegetation that borders portions of the Lake Merritt Channel (LSA obs.), which represents marginal nesting habitat for this species.

(2) Waterfront Trail (Group 2). The Oakland Waterfront Trail is part of the San Francisco Bay Trail, a planned 400-mile network of bicycle and hiking trails that will form a continuous ring around the Bay. The Waterfront Trail group consists of discontinuous sites along the proposed trail alignment. Because habitat conditions are similar among project component sites (LSA obs.), the existing biological resources will be described collectively for the Waterfront Trail group, which is typical of the north shoreline of the Oakland Inner Harbor.

Vegetation and Habitats. The Waterfront Trail sites are located primarily on bay fill land and most of the area is developed with very little native plant cover. Habitat types identified include shoreline habitats, non-native grassland/ruderal, landscaped or developed areas, coyote brush scrub, barren areas, and tidal marsh.

The shoreline habitats on the north side of the Oakland Inner Harbor are mostly comprised of human-made banks such as rock and concrete rip-rap, concrete retaining walls, and piers. The physical structure of rip-rap varies from recently constructed grouted rip-rap (e.g., around Estuary Park) to a loose conglomeration of concrete blocks, bricks, and other hard debris. Crevices within the rip-rap support small clumps of cordgrass (*Spartina* sp.), pickleweed (*Salicornia virginica*), and marsh gumplant. Larger cordgrass stands (i.e., at least 3 feet wide and 10 feet long) are scattered along the length of the shoreline, often growing within the tidal zone at the base of rip-rap. Other shoreline areas consist of rocks, gravel, soil, small blocks of concrete, and other debris that have eroded out of the adjacent upland fill areas. In some of these eroded fill areas, shoreline erosion has created a gradually sloping profile, allowing the establishment of small stands of cordgrass and other marsh vegetation.

Non-native grassland is characterized by a dense cover of introduced annual grasses such as Italian ryegrass (*Lolium multiflorum*), ripgut brome (*Bromus diandrus*), rabbit-foot grass (*Polypogon monspeliensis*), and Bermuda grass (*Cynodon dactylon*). Ruderal (weedy) vegetation often consists partially of non-native grasses, but also includes a large component of non-native herbaceous plants such as poison hemlock (*Conium maculatum*), bristly ox-tongue (*Picris echioides*), pampas grass (*Cortedaria jubata*), and wild radish (*Raphanus sativa*). These habitat types occur primarily at the Cryer site and 66th Avenue Gateway. The Cryer site also contains a few coyote brush (*Baccharis pilularis*) shrubs.

[19] Cogswell, H. L. 2000. Song sparrow. Pp. 374–385 *in* P. R. Olofson, editor. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project, San Francisco Regional Water Quality Control Board, Oakland, California.

Numerous buildings, warehouses, and residential structures are present within and adjacent to the Waterfront Trail area. Some buildings appear abandoned while others are currently used for storage and industrial uses. Landscaped areas consist of ornamental trees and shrubs planted around buildings and along roads (e.g., Monterey pines along Alameda Avenue), as well as existing parklands at Estuary Park and Union Point Park. The two parks also contain extensive areas of managed turf (i.e., lawns). Several large blue gum eucalyptus (*Eucalyptus globulus*), which were likely planted as landscaping, are present at the 66th Avenue Gateway site. A small patch of dense scrub dominated by coyote brush and poison hemlock is present at the 66th Avenue Gateway site. Other species present include iceplant (*Carpobrotus* sp.), French broom (*Genista monspessulanus*), sweet fennel (*Foeniculum vulgare*), olive (*Olea* sp.), Cape ivy (*Delairea odorata*), yellow sweet clover (*Melilotus indica*), yellow star-thistle (*Centaurea solstitialis*), California poppy (*Eschscholzia californica*), and quail bush (*Atriplex lentiformis*).

The Brooklyn Basin site consists of a mostly barren lot comprised of gravel, eroded asphalt, and (in some areas) sparse ruderal vegetation (poison hemlock and bristly ox-tongue). Similar conditions are present at the Cryer site, although ruderal vegetation is more prevalent.

A small portion of Damon Marsh, a tidal marsh adjacent to San Leandro Bay, extrudes into the northern portion of the 66th Avenue Gateway site. California cordgrass (*Spartina foliosa*) is the dominant plant species, with seaside arrow grass (*Triglochin maritime*), curly dock (*Rumex crispus*), jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), salt grass, and pickleweed covering smaller areas. In addition, an isolated wetland dominated by pickleweed is present at the northern end of the site, east of the Bay Trail levee. Other species present in this marsh fragment include fat hen (*Atriplex triangularis*), lady's thumb (*Polygonum persicaria*), willow weed (*Epilobium ciliatum*), salt grass, and curly dock.

Wildlife. Bird species expected to occur on and adjacent to the Waterfront Trail sites are similar to those described above for Lake Merritt, especially waterbirds. The sites' closer proximity to the open waters of the Oakland Inner Harbor results in higher numbers of shorebirds, gulls, terns, cormorants, and brown pelicans. These waters support many of the same ducks and grebe species that occur in Lake Merritt, but in somewhat lower numbers since they are more exposed to boat traffic and human activities on the adjacent shoreline. The rip-rap and eroded fill portions of the shoreline provide some habitat value to foraging wading birds (i.e., herons and egrets) and common shorebirds such as willet, spotted sandpiper, and killdeer. The shoreline adjacent to the 66th Avenue Gateway site supports a much more diverse shorebird community than the remaining portions of the shoreline, due to the large tidal mudflats, a critical foraging habitat for shorebirds. The nearby tidal marsh also supports many bird species specifically adapted to this habitat. Species observed in this area that were not encountered elsewhere along the shoreline include Virginia rail, canvasback, cinnamon teal, black-necked stilt, American avocet, western sandpiper, dunlin, dowitcher, black-bellied plover, marsh wren, salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), and Alameda song sparrow.

Landbird species expected to use the upland portions of the Waterfront Trail sites are similar to those expected around Lake Merritt, although the limited tree and shrub cover at many of the Waterfront Trail sites results in lower habitat value. Species observed during the January 19, 2007 reconnaissance survey include rock pigeon, Anna's hummingbird, black phoebe, American crow, American robin, yellow-rumped warbler, and Townsend's warbler. Other common urban-adapted

species expected to occur include California towhee, northern mockingbird, white-crowned sparrow, and house finch.

Waterfront Trail sites that contain at least some vegetative cover (e.g., 66th Avenue Gateway) are expected to support the same common, urban-adapted amphibians, reptiles, and mammals as those mentioned above for Lake Merritt. Such species are less likely to occur on barren or fully landscaped sites that lack natural or ruderal vegetation.

Special-status Species. Of the 56 special-status plant and animal species listed in Table IV.F-1, 15 animal species are considered to have some potential to occur on or adjacent to the Waterfront Trail area: chinook salmon (*Oncorhynchus tshawytscha*) (Sacramento Valley winter-run and Central Valley spring-run evolutionarily significant units [ESUs]), steelhead (*Oncorhynchus mykiss*) (central California coast ESU), coho salmon (*Oncorhynchus kisutch*) (central California ESU), California black rail (*Laterallus jamaicensis coturniculus*), California clapper rail (*Rallus longirostris obsoletus*), California least tern (*Sterna antillarum browni*), salt marsh common yellowthroat, California brown pelican, double-crested cormorant, Barrow's goldeneye, Cooper's hawk, American peregrine falcon, Alameda song sparrow, and salt marsh harvest mouse (*Reithrodontomys raviventris*). No special-status plant species are expected to occur for the same reasons provided above for Lake Merritt (i.e., history of disturbance, lack of suitable habitat).

Of the 15 above-mentioned special-status animals, only six (California brown pelican, double-crested cormorant, Cooper's hawk, American peregrine falcon, salt marsh common yellowthroat, Alameda song sparrow) have either been observed or are considered to have moderate potential to occur on or adjacent to the Waterfront Trail area. Brown pelicans (fall-winter) and double-crested cormorants (year-round) are regularly observed foraging and roosting in the Oakland Inner Harbor, although no cormorant rookery sites are present. A single peregrine falcon was seen perched atop the Fruitvale Bridge on January 21, 2007, as well as in January 2006.[20] Although there are no confirmed peregrine nest sites in the vicinity of the proposed Waterfront Trail, this species may occasionally forage along the shoreline during the winter. Cooper's hawks have not been confirmed as nesting in the area, but suitable nest trees are present at Estuary Park, along Alameda Avenue, and at the 66th Avenue Gateway site. Salt marsh common yellowthroat and Alameda song sparrow were observed and likely breed in Damon Marsh adjacent to the 66th Avenue Gateway site (LSA obs.). These two species may occasionally venture onto the site when foraging, although they are unlikely to nest there. The remainder of the Waterfront Trail area lacks tidal marsh areas of sufficient size to support either of these two species.

Other Sensitive Biological Resources. Although not identified as special-status species in the CNDDB, all native San Francisco Bay fish species are protected under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Amendments to this Act in 1996 require federal agencies to consult with the National Marine Fisheries Service regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for federally managed fish species. The Magnuson-Stevens Act defines EFH as "those areas and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The proposed Waterfront Trail is located adjacent to EFH for 83 fish species covered under the Pacific Groundfish Fishery Management Plan. This EFH includes all the waters of San Francisco Bay, below mean higher high

[20] Rauzon, M. 2007. Electronic message posted to Friends of Sausal Creek (FOSC) email listserv, January 21. http://lists.sausalcreek.org/pipermail/fosc-sausalcreek.org/2007/001057.html.

water (MHHW). Thus, any Waterfront Trail features that would be located in or over San Francisco Bay and will require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act, may be required to implement mitigation measures for impacts on EFH.

Pacific herring (*Clupea pallasi*) in San Francisco Bay are of special interest to the CDFG, because the Bay supports some of the largest spawning aggregations in California. The open waters adjacent to the Waterfront Trail, including areas under piers, could provide spawning habitat for Pacific herring. The spawning season extends from November through March, with peak activity in January.[21]

Marine mammals are also unidentified by the CNDDB as special-status species and are protected under the federal Marine Mammal Protection Act. Two species of marine mammals, harbor seal (*Phoca vitulina*) and California sea lion (*Zalophus californianus*), may occur infrequently in the Oakland Inner Harbor adjacent to the Waterfront Trail project area. It is unlikely that these species haul out regularly along the shoreline, due to the steep banks, unsuitable substrate (e.g., rip-rap, concrete banks, and piers), and high level of disturbance. If regularly used haul-out sites are identified, however, the Corps may require mitigation measures in connection with a Corps permit issued for the Waterfront Trail.

(3) Recreational Facilities (Group 3). The two components within this group are the renovation of the historic Studio One Art Center located in North Oakland and the construction of an East Oakland Sports Complex. Existing biological resources of these two areas are briefly described below.

Vegetation and Wildlife Habitat Value. Vegetation at the Studio One site is limited to a small managed turf lawn and a few ornamental trees. Similarly, vegetation at the East Oakland Recreational Center site (Ira Jinkins Community Center) consists entirely of managed turf (baseball field) and several ornamental trees planted as landscaping. Tree species present include eucalyptus, coast redwood, Monterey pine, and coast live oak.

Wildlife species expected to use these sites are similar to those urban-adapted species mentioned above for Lake Merritt, although habitat at the Studio One site is so limited that only the most common species (e.g., rock pigeon, house finch) are expected to occur there regularly. The trees at the East Oakland site (e.g., pines) have low to moderate potential to support nesting birds, including red-shouldered hawk and Cooper's hawk in the taller conifers.

Special-status Species. The only special-status species considered to have any potential to occur at either of the two sites is Cooper's hawk, for which marginal nesting habitat is present at the East Oakland site. No other special-status plant or animal species are expected to occur at the two sites due to their location within heavily urbanized portions of Oakland and consequent lack of native habitats.

(4) City-wide Creeks (Group 4). Various creeks and associated watersheds are included in the scope of Measure DD-funded creek restoration activities, but only selected locations along

[21] Tasto, R. N. 2000. Pacific herring. Pp. 81–85 *in* P. R. Olofson, editor. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. San Francisco Bay Area Wetlands Ecosystem Goals Project, San Francisco Regional Water Quality Control Board, Oakland, California.

Oakland creeks would be affected by Measure DD restoration activities. The description below is based on extensive biological information on Sausal Creek, collected by the Friends of Sausal Creek (FOSC), a volunteer-based organization that has been working with the City to restore the Sausal Creek watershed over the last 10 years.[22] The vegetation and habitats within the Sausal Creek watershed are likely representative of those that occur throughout the remaining portions of the Oakland watershed.

Vegetation and Habitats. Vegetation communities or habitat types potentially present include landscaped/developed, riparian woodland, oak woodland, mixed evergreen forest, redwood forest, grassland, chaparral, and coastal scrub.

Existing development within the Oakland watershed ranges from low-density residential development in the hills to a dense mix of commercial and residential uses in the lower reaches. Low-density development is characterized by buildings that are often located within or adjacent to sizeable patches of natural habitats such as mixed evergreen forest, grassland, or chaparral. Although ornamental plantings are often present along roads and within landscaped gardens, native species comprise a large portion of the vegetative cover. Landscaped/developed habitats in the lower reaches consist almost entirely of non-native ornamental trees and shrubs such as those mentioned above for Lake Merritt, with eucalyptus and Monterey pine probably being two of the more widely planted species. In many cases, ornamental species invade adjacent native habitats such as riparian woodland, often forming dense colonies and out-competing native species.

Riparian woodland refers to the assemblage of trees, shrubs, and herbaceous plants usually found growing along streams. Common trees and shrubs in this community include bigleaf maple (*Acer macrophyllum*), white alder (*Alnus rhombifolia*), box-elder (*Acer negundo*), arroyo willow (*Salix lasiolepis*), poison oak (*Toxicodendron diversilobum*), and black twinberry (*Lonicera involucrata* var. *ledebourii*). Common herbaceous species growing in riparian woodlands include willow-herb (*Epilobium ciliatum* ssp. *sericea*), western lady fern (*Athyrium filix-femina* var. *cyclosorum*), horsetail (*Equisetum* sp.), and sedge (*Carex* sp.).

Oak woodlands in this area primarily consist of well-spaced coast live oaks with few shrubs and a wide variety of herbaceous plants. Other tree species may include valley oak (*Quercus lobata*) and California bay (*Umbellularia californica*), but they are not as prevalent as coast live oak. Although there is little shrub cover, scattered patches of snowberry (*Symphoricarpos albus*) and poison oak may be present. Common herbaceous species include goldback fern (*Pentagramma triangularis* ssp. *triangularis*), mistletoe (*Phoradendron villosum*), California buttercup (*Ranunculus californicus*), and miner's lettuce (*Claytonia parviflora* ssp. *parviflora*). This community may occur on uplands adjacent to creek restoration sites.

Mixed evergreen forest refers to a variety of forest types characterized by closed-canopy stands of several kinds of broadleaved evergreen hardwoods or of hardwoods and conifers.[23] Because of

[22] Friends of Sausal Creek (FOSC). 2006. Sausal creek watershed plant communities. Prepared by Karen Paulsell. Friends of Sausal Creek, Oakland, California. January 16. http://www.sausalcreek.org/sausal/nature_pdf/-FOSC_habitat_plant_list.pdf

[23] Shuford, W. D., and I. C. Timossi. 1989. *Plant Communities of Marin County*. California Native Plant Society, Sacramento. 32 pp.

variation in slope, moisture, and elevational gradients across sites, this community varies in species composition and may grade into other communities such as oak woodland or grassland. At moister, shadier sites, California bay may form dense stands with limited to no understory, although species such as licorice fern (*Polypodium calirhiza*), western sword fern (*Polystichum munitum*), and California huckleberry (*Vaccinium ovatum*) may grow in small numbers. Other areas are co-dominated by Pacific madrone (*Arbutus menziesii*), coast live oak, and California bay. California buckeye (*Aesculus californica*) may also be an important component. Additional herbaceous species that may occur in the understory of these forests include Douglas iris (*Iris douglasiana*), thimbleberry (*Rubus parviflorus*), yerba buena (*Satureja douglasii*), and Solomon's seal (*Smilacena* sp.).

Redwood forests dominated by coast redwood are limited to steep, moist canyons in the upper reaches of Oakland watersheds. Many of the understory species that grow in oak woodlands and mixed evergreen forest can also be found in redwood forests, although species unique to this community such as salal (*Gaultheria shallon*) and redwood sorrel (*Oxalis oregano*) are also present. Grasslands are open, treeless expanses of grasses and associated herbaceous species. Many California grasslands formerly comprised of native bunchgrass species have been invaded by non-native annual grasses introduced by domestic livestock in the 1700's.[24] Common non-native grasses in the Oakland hills include wild oat (*Avena fatua*), ripgut brome, and Italian ryegrass. Native bunchgrasses documented in the Sausal Creek watershed include big squirreltail (*Elymus multisetus*), melic (*Melica* sp.), and purple needlegrass (*Nasella pulchra*). Common herbaceous species that grow in both native and non-native grasslands include blue dicks (*Dichelostemma capitatum* ssp. *capitatum*), California plantain (*Plantago erecta*), blue-eyed grass (*Sisyrinchium bellum*), and California poppy.

Chaparral is a vegetation type in which most of the obvious components are tough-leaved evergreen shrubs that are adapted to dry habitat conditions.[25] Dominant shrubs include chamise (*Adenostoma fasciculatum*), various manzanitas (*Arctostaphylos* sp.), mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), and California coffeeberry (*Rhamnus californica*).

Coastal scrub is characterized by the presence of low shrubs intermixed with grassy meadows, and occurs within the project area on sunny hillsides.[26] Common shrub species include bush monkeyflower (*Mimulus aurantiacus*), California sagebrush (*Artemisia californica*), coyote brush, and California coffeeberry. Common herbaceous species include mugwort (*Artemisia douglasiana*), cow parsnip (*Heracleum lanatum*), bedstraw (*Galium* sp.), and bee plant (*Scrophularia californica* ssp. *californica*).

Wildlife. The diversity of habitats in the Oakland watershed results in a corresponding diversity of native wildlife species. Urban-adapted species may be present in varying amounts, depending on the proximity of urban development, but many additional species characteristic of less disturbed, more natural habitats are likely to occur. Appendix H contains tables compiled by the FOSC of birds, reptiles, amphibians, and mammals that occur or may occur in the upper Sausal Creek watershed. These species lists include most of the terrestrial wildlife species that could potentially occur in the Oakland watershed.

[24] Beidleman, L. H., and E. N. Kozloff. 2003. *Plants of the San Francisco Bay Region*. University of California Press, Berkeley and Los Angeles. 504 pp.

[25] Ibid.

[26] Op. Cit.

Rainbow trout (non-anadromous form of steelhead) are known from the Sausal Creek and Lion Creek watersheds.[27] Trout in the upper Sausal Creek watershed appear to be wild, although individuals with hatchery characteristics have been found in the population, as well. Hatchery-raised rainbow trout are present in Lake Temescal.[28] Suitable habitat upstream of Highway 13 in the Lion Creek watershed supports a small, isolated, and apparently self-sustaining population of what may be wild rainbow trout, originally derived from steelhead.[29]

Special-status Species. Of the 56 special-status species listed in Table IV.F-1, four plant and 11 animal species are either known to occur or have some potential to occur within the Oakland watershed: pallid manzanita (*Arctostaphylos pallida*), western leatherwood (*Dirca occidentalis*), Presidio clarkia (*Clarkia franciscana*), most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*), California red-legged frog (*Rana aurora draytonii*), foothill yellow-legged frog (*Rana boylii*), Pacific pond turtle (*Actinemys marmorata*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), sharp-shinned hawk, golden eagle, pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), western mastiff bat (*Eumops perotis*), silver-haired bat (*Lasionycteris noctivagans*), and Cooper's hawk.

Pallid manzanita is known to occur at the Huckleberry Botanic Preserve and in the vicinity of Manzanita Drive in the upper Sausal Creek watershed.[30] However, given its reliance on rocky ridges and outcrops in chaparral, it is highly unlikely to occur at any of the proposed creek restoration sites, which are presumably located in riparian woodland or mixed evergreen forest habitats. Western leatherwood has greater potential to occur, given that suitable habitat may be present at some of the restoration sites.

Of the 11 special-status animal species identified above, only Pacific pond turtle, sharp-shinned hawk, and Cooper's hawk are considered to have moderate potential to occur at the creek restoration sites. Although some sites may contain marginal habitat for California red-legged frog and foothill yellow-legged frog, neither of these species have been recorded west of the crest of the Berkeley and Oakland Hills. In addition, neither species was found during surveys of Sausal Creek and Arroyo Viejo conducted in 2001.[31] Alameda whipsnake is not expected to occur at any restoration sites due to its dependence on chaparral and sage scrub habitats, which are far removed from the drainage bottoms where restoration activities will occur. Pallid and Townsend's big-eared bats likely occur in the Oakland watershed, and may occasionally forage over some of the restoration sites. However, there are no known roost sites in the Oakland Hills.[32] Pacific pond turtles have been observed in the upper Sausal Creek watershed, and may occur at restoration sites where suitable habitat is present. Some of the creek restoration sites may also contain suitable nest sites for sharp-shinned and Cooper's hawks.

[27] Leidy, R. A., G. S. Becker, and B. N. Harvey. 2005. Historical distribution and current status of steelhead/rainbow trout (*Oncorhynchus mykiss*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, California.

[28] Personal communication with Lesley Estes, City of Oakland

[29] Ibid.

[30] Op. Cit.

[31] Personal communication with Lesley Estes, City of Oakland, April 17, 2007.

[32] Op. Cit.

c. Regulatory Context. Applicable laws and regulations pertaining to biological resources are summarized below.

(1) Federal Endangered Species Act. The Federal Endangered Species Act (FESA) protects listed species from "take," broadly defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Any such activity can be defined as "take" even if it is unintentional or accidental. Listed plant species are typically afforded less protection than listed animals. The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over federally listed threatened and endangered plant and animal species, while the National Marine Fisheries Service (NMFS) (formerly NOAA Fisheries) has jurisdiction over all federally listed anadromous fish (i.e., salmonids).

An endangered species is one that is considered in danger of becoming extinct throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Federal agencies involved in permitting projects that may result in take of federally listed species (e.g., Corps) are required under Section 7 of the FESA to consult with the USFWS prior to issuing such permits. Any activity that could result in the take of a federally listed species, and is not authorized as part of a Section 7 consultation, requires a FESA Section 10 take permit from the USFWS.

(2) Clean Water Act. The U.S. Army Corps of Engineers (Corps) is responsible under Section 404 of the federal Clean Water Act to regulate the discharge of fill material into waters of the United States. Waters of the U.S. and their lateral limits are defined in 33 CFR Part 328.3(a) and include streams that are tributaries to navigable waters and their adjacent wetlands. The lateral limits of jurisdiction for a non-tidal stream are measured at the line of the Ordinary High Water Mark (OHWM) (33 CFR Part 328.3[e]) or the limit of adjacent wetlands (33 CFR Part 328.3[b]). Any permanent extension of the limits of an existing water of the U.S., whether natural or man-made, results in a similar extension of Corps jurisdiction (33 CFR Part 328.5).

Waters of the U.S. fall into two broad categories: wetlands and other waters. Other waters include waterbodies and watercourses such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands include marshes, wet meadows, seeps, floodplains, basins, and other areas experiencing extended seasonal soil saturation. Seasonally or intermittently inundated features, such as seasonal ponds, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and support wetland plant communities. Seasonally inundated waterbodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the U.S. Other waters that cannot trace a continuous hydrologic connection to a navigable water of the U.S. are not tributary to waters of the U.S. and are termed "isolated waters." Wetlands that are not adjacent to other waters are termed "isolated wetlands." ("Adjacent" means bordering, contiguous or neighboring, and includes wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like.) Isolated wetlands and waters are jurisdictional if their use, degradation, or destruction could affect interstate or foreign commerce (33 CFR Section 328.3[a]). The Corps may or may not take jurisdiction over isolated wetlands, depending on the specific circumstances.

In general, a Section 404 permit must be obtained from the Corps before filling or grading wetlands or other waters of the U.S. Certain projects may qualify for authorization under a Nationwide Permit

(NWP). The purpose of the NWP program is to streamline the evaluation and approval process throughout the nation for certain types of activities that have only minimal impacts to the aquatic environment. Many NWPs require the applicant to submit a pre-construction notification (PCN) to the appropriate Corps office and to obtain a project-specific authorization. The Corps is required to consult with the USFWS under Section 7 of the FESA if the permitted activity may result in the take of federally listed species.

All Corps permits require state water quality certification under Section 401 of the Clean Water Act. This regulatory program is administered by the San Francisco Bay Regional Water Quality Control Board (Water Board). Projects that propose to fill wetlands or other waters of the U.S. must apply for water quality certification from the Water Board. The Water Board has adopted a policy requiring mitigation for any loss of wetlands, streams, or other waters of the U.S.

(3) Porter-Cologne Water Quality Control Act. Under this Act (California Water Code Sections 13000-14920), the Water Board is authorized to regulate the discharge of waste that could affect the quality of the waters of the State. Therefore, even if a project does not require a federal permit, it may still require review and approval by the Water Board (e.g., for impacts to isolated wetlands and other waters). When reviewing applications, the Water Board focuses on ensuring that projects do not affect the "beneficial uses" associated with waters of the State. In most cases, the Water Board seeks to protect these beneficial uses by requiring the integration of water quality control measures into projects that will require discharge into waters of the State. For most construction projects, the Water Board requires the use of construction and post-construction Best Management Practices (BMPs).

(4) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to enforce this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters.

(5) California Endangered Species Act. The California Department of Fish and Game (CDFG) has jurisdiction over state-listed endangered, threatened, and rare plant and animal species under the California Endangered Species Act (CESA). In addition, species designated as "candidates" for listing under CESA are protected by its provisions. The CDFG also maintains a list of Species of Special Concern, defined as species that appear to be vulnerable to extinction because of declining populations, limited ranges, and/or continuing threats. Species of Special Concern are not afforded legal protection under CESA.

(6) California Fish and Game Code. The CDFG is also responsible for enforcing the California Fish and Game Code, which contains several provisions potentially relevant to construction projects. For example, Section 1602 of the Fish and Game Code governs the issuance of Lake and Streambed Alteration Agreements by the CDFG. Lake and Streambed Alteration Agreements are required whenever proposed project activities would substantially divert or obstruct

the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as such by the CDFG.

The Fish and Game Code also lists animal species designated as Fully Protected or Protected, which may not be taken or possessed without a permit from the Fish and Game Commission and/or the CDFG. These take permits do not allow "incidental take" and are more restrictive than the take allowed under Section 2081 of CESA. Fully Protected species are listed in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the Fish and Game Code, while Protected amphibians and reptiles are listed in Chapter 5, Sections 41 and 42.

Section 3503 of the Fish and Game Code prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks and eagles) or Strigiformes (owls) and their nests. Those provisions, along with the federal Migratory Bird Treaty Act (MBTA) (described below), essentially serve to protect nesting native birds. Non-native species, including European starling, house sparrow, and rock pigeon, are not afforded any protection under the MBTA or Fish and Game Code (except that hunting regulations apply to some non-native species).

(7) Migratory Bird Treaty Act. The MBTA prohibits the taking, hunting, killing, selling, purchasing, etc. of migratory birds, parts of migratory birds, and their eggs and nests. As used in the MBTA, the term "take" is defined as "to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires." Most bird species native to the U.S. are covered by this Act.

(8) California Environmental Quality Act. The California Environmental Quality Act (CEQA) applies to "projects" proposed to be undertaken or requiring approval by State or local government agencies. Projects are defined as having the potential to have physical impact on the environment. Under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. With sufficient documentation, a species could be shown to meet the definition of rare or endangered under CEQA and be considered a "de facto" rare or endangered species.

(9) Magnuson-Stevens Fishery Conservation and Management Act. Although not identified as special-status species in the CNDDB, all native San Francisco Bay fish species are protected under the Magnuson-Stevens Act. Amendments to this Act in 1996 require federal agencies to consult with the NMFS regarding any action or proposed action that may adversely affect Essential Fish Habitat (EFH) for federally managed fish species. The Magnuson-Stevens Act defines EFH as "those areas and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

(10) Marine Mammal Protection Act. All marine mammals (i.e., whales, dolphins, porpoises, seals, sea lions, and walruses) are protected by the Marine Mammal Protection Act (MMPA) of 1972. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. The MMPA is enforced by the NMFS.

(11) City of Oakland General Plan. The City has authority over land and development within city limits. The City exercises its authority through policies and planning documents such as the General Plan and City Ordinances such as the City Municipal Code. The Open Space Conservation and Recreation (OSCAR) and Land Use and Transportation Element (LUTE) of the General Plan have numerous policies related to the protection of biological resources. The primary OSCAR policies relevant to biological resources include the following:

- Policy CO-5.3: Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program, to: (a) reduce water pollution associated with stormwater runoff; (b) reduce water pollution associated with hazardous spills, runoff from hazardous material areas, improper disposal of household hazardous wastes, illicit dumping, and marina live-aboards; and (c) improve water quality in Lake Merritt to enhance the Lake's aesthetic, recreational, and ecological functions.
- Policy CO 6.1: Protect Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects which bury creeks or divert them into concrete channels.
- Policy CO-6.4: Manage Oakland's lakes to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. Discourage new recreational users which impair the ability of the lakes to support fish and wildlife. Support improvements which enhance water circulation, water quality, and habitat value, provided they are cost-effective and are compatible with established recreational activities.
- Policy CO-6.5: Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.
- Policy CO-7.1: Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.
- Policy CO-7.2: Encourage efforts to restore native plant communities in areas where they have been compromised by development or invasive species, provided that such efforts do not increase an area's susceptibility to wildfire.
- Policy CO-7.4: Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.
- Policy CO-8.1: Work with federal, state, and regional agencies on an ongoing basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.
- Policy CO-8.2: Limit recreational uses within wetland "parks" to activities that are consistent with the fragile environmental characteristics of the areas. These uses may include wildlife refuges, ecological study areas, and where appropriate, interpretive boardwalks and nature centers.
- Policy CO-9.1: Protect rare, endangered, and threatened species by conserving and enhancing their habitat and requiring mitigation of potential adverse impacts when development occurs within habitat areas.
- Policy CO-11.1: Protect wildlife from the hazards of urbanization, including loss of habitat and predation by domestic animals.
- Policy CO-11.2: Protect and enhance migratory corridors for wildlife. Where such corridors are privately owned, require new development to retain native habitat or take other measures which help sustain local wildlife populations and migratory patterns.
- Policy OS-7.4: Expand and enhance the City's waterfront park areas. Signage and access provisions to existing waterfront parks should be improved. Opportunities for new shoreline parks as depicted in Figure 7 (of the OSCAR) should be pursued as redevelopment along the waterfront occurs. A variety of park environments should be created, including active recreation areas, fishing piers and boating facilities, natural areas, and small "pocket" parks with landscaping and benches, all linked by linear parks or pedestrian paths emphasizing shoreline views and access.

- Policy OS-12.1: Incorporate a broad and varied range of tree species which is reflected on a City-maintained list of approved trees. Street tree selection should respond to the general environmental conditions at the planting site, including climate and micro-climate, soil types, topography, existing tree planting, maintenance of adequate distance between street trees and other features, the character of existing development, and the size and context of the tree planting area.
- Policy REC-2.3: Protect sensitive natural areas within parks, including creeks and woodlands, and integrate them into park design. Require new recreational facilities to respect existing park character, be compatible with the natural environment, and achieve a high standard of design quality.

The following policies from the LUTE of the General Plan are applicable to the proposed project:

- Policy W3.2: The function, design and appearance, and supplementary characteristics of all uses, activities, and facilities should enhance, and should not detract from or damage the quality of, the overall natural and built environment along the waterfront.
- Policy W3.3: Native plant communities, wildlife habitats, and sensitive habitats should be protected and enhanced.

The Oakland Estuary Plan contains the following policy relevant to biological resources:

- Policy OAK-1.1: Encourage the preservation and enhancement of wetland areas. The waterfront should be improved in a manner that maintains and enhances the ecological value of the area in general and the Lake Merritt Channel in particular. In some locations, tidelands function as tidal wetlands, providing marsh habitat for fish, migratory waterfowl, and other animals. Improvements should be encouraged that restore wetland and marsh habitat. Wetlands should be protected by such treatments as setting back trails from the shoreline, installing suitable buffer planting to prevent disruption nesting and resting areas, seasonal routing of pedestrians to avoid sensitive habitats, etc. As improvements and projects are considered, the City and Port should work with interested groups and organizations to ensure appropriate treatments along the shoreline, particularly along the channel on the eastern bank between I-880 and Embarcadero.

(12) City of Oakland Municipal Code. Title 12, Chapter 12.36 of the Oakland Municipal Code (OMC) requires that a permit be obtained prior to removing protected trees from either City or private property. Protected trees are defined as follows:

- Any coast live oak (*Quercus agrifolia*) larger than 4 inches diameter-at-breast height (dbh)
- Any tree that is larger than 9 inches dbh, except eucalyptus trees, or Monterey pines on City property and in development-related situations where more than five per acre are proposed to be removed.

(13) City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval (Standard Conditions of Approval) that would apply to the proposed project are listed below. Implementation of these conditions would ensure minimization of a project's potential impacts to biological resources.

Condition 31: Tree Removal Permit on Creekside Properties. *Prior to issuance of a final inspection of the building permit.* Prior to removal of any tree located on the project site which is identified as a creekside property, the project applicant must secure the applicable creek protection permit, and abide by the conditions of that permit.

Condition 32: Tree Removal During Breeding Season. *Prior to issuance of a tree removal permit.* To the extent feasible, removal of the trees and other vegetation suitable for nesting of raptors shall not occur during the breeding season of March 15 through August 15. If tree removal must occur during the breeding season, all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. Pre-removal surveys shall be conducted within 15 days prior to the start of work from March 15 through May 31, and within 30 days prior to the start of work from June 1 through August 15. If the survey indicates the potential presence of nesting raptors or other birds, the biologist shall determine an appropriately sized buffer around the nest in which no work will be allowed until the young have successfully fledged. The size of the nest buffer will be determined by the biologist in consultation with the CDFG, and will be based to a large extent on the nesting species and its sensitivity to disturbance. In general, buffer sizes of 200 feet for raptors and 50 feet for other birds should suffice to prevent

disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

Condition 33: Tree Removal Permit. *Prior to issuance of a demolition, grading, or building permit.* Prior to removal of any protected trees, per the Protected Tree Ordinance, located on the project site or in the public right-of-way adjacent to the project, the project applicant must secure a tree removal permit, and abide by the conditions of that permit.

Condition 34: Tree Replacement Plantings. *Prior to issuance of a final inspection of the building permit.* Replacement plantings shall be required for erosion control, groundwater replenishment, visual screening and wildlife habitat in accordance with the following criteria:

a) No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.

b) Replacement tree species shall consist of *Sequoia sempervirens* (Coast Redwood), *Quercus agrifolia* (Coast Live Oak), *Arbutus menziesii* (Madrone), *Aesculus californica* (California Buckeye) or *Umbellularia californica* (California Bay Laurel) or other tree species acceptable to the Tree Services Division.

c) Replacement trees shall be at least of 24-inch box size, unless a smaller size is recommended by the arborist, except that three 15-gallon-size trees may be substituted for each 24-inch box size tree where appropriate.

d) Minimum planting areas must be available on site as follows:

- For *Sequoia sempervirens*, three hundred fifteen square feet per tree;
- For all other species listed in #b above, seven hundred (700) square feet per tree.

e) In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee as determined by the master fee schedule of the city may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.

f) Plantings shall be installed prior to the issuance of a final inspection of building permit, subject to seasonal constraints, and shall be maintained by the project applicant until established. The Tree Reviewer may require a landscape plan showing the replacement planting and the method of irrigation. Any replacement planting which fails to become established within one year of planting shall be replanted at the project applicant's expense.

Condition 35: Tree Protection During Construction. *Prior to issuance of a demolition, grading, or building permit.* Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist:

a) Before the start of any clearing, excavation, construction or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the City Tree Reviewer. Such fences shall remain in place for duration of all such work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and other debris which will avoid injury to any protected tree.

b) Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the City Tree Reviewer from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree.

c) No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the Tree Reviewer from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the tree reviewer. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree.

d) Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration.

e) If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the Public Works Agency of such damage. If, in the professional opinion of the Tree Reviewer, such tree cannot be preserved in a healthy state, the Tree Reviewer shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed.

f) All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations.

Condition 69: Creek Protection Plan. *Prior to and ongoing throughout demolition, grading, and/or construction activities.*

a) The approved creek protection plan shall be included in the project drawings submitted for a building permit (or other construction-related permit). The project applicant shall implement the creek protection plan to minimize potential impacts to the creek during and after construction of the project. The plan shall fully describe in plan and written form all erosion, sediment, stormwater, and construction management measures to be implemented on-site.

b) If the plan includes a stormwater system, all stormwater outfalls shall include energy dissipation that slows the velocity of the water at the point of outflow to maximize infiltration and minimize erosion. The project shall not result in a substantial increase in stormwater runoff volume or velocity to the creek or storm drains.

Condition 70: Regulatory Permits and Authorizations. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* Prior to construction within the vicinity of the creek, the project applicant shall obtain all necessary regulatory permits and authorizations from the U.S Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), California Department of Fish and Game, and the City of Oakland, and shall comply with all conditions issued by applicable agencies. Required permit approvals and certifications shall include, but not be limited to the following:

a) U.S. Army Corps of Engineers (Corps): Section 404. Permit approval from the Corps shall be obtained for the placement of dredge or fill material in Waters of the U.S., if any, within the interior of the project site, pursuant to Section 404 of the federal Clean Water Act.

b) Regional Water Quality Control Board (RWQCB): Section 401 Water Quality Certification. Certification that the project will not violate state water quality standards is required before the Corps can issue a 404 permit, above.

c) California Department of Fish and Game (CDFG): Section 1602 Lake and Streambed Alteration Agreement. Work that will alter the bed or bank of a stream requires authorization from CDFG.

Condition 71: Creek Monitoring. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* A qualified geotechnical engineer and/or environmental consultant shall be retained and paid for by the project applicant to make site visits during all grading activities; and as a follow-up, submit to the Building Services Division a letter certifying that the erosion and sedimentation control measures set forth in the Creek Protection Permit submittal material have been instituted during the grading activities.

Condition 72: Creek Landscaping Plan. *Prior to issuance of a demolition, grading, and/or building permit within vicinity of the creek.* The project applicant shall develop a final detailed landscaping and irrigation plan for review and approval by the Planning and Zoning Division prepared by a licensed landscape architect or other qualified person. Such a plan shall include a planting schedule, detailing plant types and locations, and a system for temporary irrigation of plantings.

a) Plant and maintain only drought-tolerant plants on the site where appropriate as well as native and riparian plants in and adjacent to riparian corridors. Along the riparian corridor, native plants shall not be disturbed to the maximum extent feasible. Any areas disturbed along the riparian corridor shall be replanted with mature native riparian vegetation and be maintained to ensure survival.

b) All landscaping indicated on the approved landscape plan shall be installed prior to the issuance of a Final inspection of the building permit, unless bonded pursuant to the provisions of Section 17.124.50 of the Oakland Planning Code.

c) All landscaping areas shown on the approved plans shall be maintained in neat and safe conditions, and all plants shall be maintained in good growing condition and, whenever necessary replaced with new plant materials to ensure continued compliance with all applicable landscaping requirements. All paving or impervious surfaces shall occur only on approved areas.

Condition 73: Creek Dewatering and Aquatic Life. *Prior to the start of and ongoing throughout any in-water construction activity.*

a) If any dam or other artificial obstruction is constructed, maintained, or placed in operation within the stream channel, ensure that sufficient water is allowed to pass down channel at all times to maintain aquatic life (native fish, native amphibians, and western pond turtles) below the dam or other artificial obstruction.

b) The project applicant shall hire a biologist to relocate all native fish/native amphibians/western pond turtles within the work site, with all necessary State and Federal permits, prior to dewatering. Captured native fish/native amphibians/western pond turtles shall be moved to the nearest appropriate site on the stream channel downstream. The applicant shall first obtain a project-specific authorization from the CDFG and/or USFWS, as applicable, to relocate these animals. The biologist/contractor shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets, and by hand. Captured aquatic life shall be released immediately in the nearest appropriate downstream site. This condition does not allow the take or disturbance of any state- or federally listed species nor state-listed species of special concern, unless the applicant obtains a project-specific authorization from the CDFG and/or USFWS, as applicable.

2. Impacts and Mitigation Measures

This section discusses potential impacts to biological resources that could result from implementation of Measure DD. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with Measure DD and identifies mitigation measures, as appropriate.

a. Criteria of Significance. Implementation of the proposed project components would have a significant impact on biological resources if they would:

1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;

2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;

3) Have a substantial adverse effect on federally protected wetlands (as defined by Section 404 of the Clean Water Act) or state protected wetlands, through direct removal, filling, hydrological interruption, or other means;

4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

5) Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan;

6) Fundamentally conflict with the City of Oakland Tree Preservation and Removal Ordinance (OMC Chapter 12.36) by removal of protected trees under certain circumstances. Factors to be

considered in determining significance include: the number, type, size, location and condition of (a) the protected trees to be removed and/or impacted by construction and (b) the protected trees to remain, with special consideration given to native trees.[33]

Protected trees include the following:

Coast live oak measuring 4 inches dbh or larger, and any other tree measuring 9 inches dbh or larger except eucalyptus and Monterey pine; however, Monterey pine trees on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed are considered to be protected trees; or

7) Fundamentally conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect biological resources. Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is substantial degradation of riparian and aquatic habitat through: (a) discharging a substantial amount of pollutants into a creek; (b) significantly modifying the natural flow of the water; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) adversely impacting the riparian corridor by significantly altering vegetation or wildlife habitat.

The level of impact to biological resources is discussed in the following section and summarized in Table IV.F-2. Many of the potential impacts will be reduced to a less-than-significant level through implementation of the City's Standard Conditions of Approval (see above), which are included as part of the project.

b. Impacts Applicable to All Project Groups. Several of the impacts to biological resources that may result from the implementation of Measure DD would essentially be the same for each or most of the four project groups. These impacts are defined below for each criterion of significance listed above. Where applicable, the City's specific Standard Conditions of Approval that will reduce potential impacts to a less-than-significant level are identified in the text after the discussion of the impact.

(1) Candidate, Sensitive, or Special-status Species. The only special-status species potentially occurring within all component groups is Cooper's hawk, a California Species of Special Concern. The numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk. In addition, some of the creek restoration sites in the upper Oakland watershed may contain suitable nest trees for sharp-shinned hawk. Both these species are California Species of Special Concern. Proposed tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-shinned hawks by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure and/or nest abandonment.

[33] Oakland Planning Code section 17.158.280E2 states that "Development related" tree removal permits are exempt from CEQA if no single tree to be removed has a dbh of 36 inches or greater **and** the cumulative trunk area of all trees to be removed does not exceed 0.1 percent of the total lot area.

Table IV.F-2: Summary of Potential Impacts – Biological Resources

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Adversely affect a candidate, sensitive or special-status species?	O	⊙ BIO-1 BIO-2	O	O
2. Adversely affect riparian habitat of other sensitive natural community?	==	==	==	O
3. Adversely affect federally or state protected wetlands?	⊙ BIO-3	⊙ BIO-3	==	⊙ BIO-3
4. Interfere with a migratory wildlife corridor or wildlife nursery site?	⊙ BIO-4	O	O	O
5. Conflict with any applicable habitat conservation plan or natural community conservation plan?	==	==	==	==
6. Conflict with the City of Oakland Tree Preservation and Removal Ordinance?	O	O	O	O
7. Conflict with the City of Oakland Creek Protection Ordinance?	O	O	==	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with Standard Conditions of Approval
⊙ Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
BIO-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-shinned hawks to a less-than-significant level. The pre-construction survey shall be conducted within 15 days prior to the start of work from March 15 though May (since there is higher potential for birds to initiate nesting during this period), and within 30 days prior to the start of work from June through August 15.

(2) Riparian Habitat. No riparian habitat or other sensitive natural communities are present at the Lake Merritt and Lake Merritt Channel or Recreational Facilities groups. A small area of pickleweed wetland, considered a sensitive natural community by the CDFG, is present on the 66th Avenue Gateway site within the Waterfront Trail group, but will not be affected by any proposed project activities. Potential impacts to wildlife that may use this plant community are discussed in Section IV.F2c. The only project group that may result in direct impacts to riparian habitat or other sensitive natural communities is the City-wide Creeks group. This potential impact is discussed in Section IV.F2c.

(3) Wetlands. Waters of the U.S. and State are present on or adjacent to several components within the Lake Merritt and the Lake Merritt Channel, Waterfront Trail, and City-wide Creeks groups. Since no such features are present within the two components of the Recreational Facilities group, this potential impact is discussed in Section IV.F2c.

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. Suitable nesting habitat for native bird species protected by the federal Migratory Bird Treaty Act (MBTA) and California Fish and Game Code is present within all of the project group areas. Additional impacts unique to the Lake Merritt Channel are discussed in Section IV.F2c.

Most existing vegetation and some un-vegetated areas within the project area have at least some potential to support breeding activities by native birds protected under the MBTA and California Fish and Game Code. Proposed removal of trees and other vegetation at Lake Merritt and the Lake Merritt Channel and potential vegetation removal for other project components (e.g., grading, clearing, and grubbing of existing landscaped areas at creek restoration sites) could directly impact nesting birds by removing vegetation that contains active nests. In addition, species that nest in un-vegetated areas (i.e., killdeer) may be vulnerable to construction activities (e.g., grading, site demolition, equipment traffic). Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting birds to a less-than-significant level.

(5) Regional Conservation Plans. The areas covered by the Measure DD Implementation Project are not currently subject to any adopted habitat conservation plans or natural community conservation plans.

(6) Protected Trees. Based on current plans, the Lake Merritt and Lake Merritt Channel group proposes to remove a number of protected trees. Protected trees might also be removed as part of the Waterfront Trail, Recreational Facilities, and City-wide Creeks groups. This impact is discussed in Section IV.F2c.

(7) Creek Protection Ordinance. Project components within the Lake Merritt and Lake Merritt Channel and City-wide Creeks groups are subject to the City's Creek Protection Ordinance. In addition, some creeks (e.g., Sausal Creek) discharge to the Oakland Harbor Channel within or adjacent to the Waterfront Trail group study area. No creeks are located on or adjacent to the site of the proposed Recreational Facilities group. This impact is discussed in Section IV.F2c.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential impacts that are unique to individual project components.

(1) Candidate, Sensitive, or Special-status Species. Potential site-specific impacts to special-status species are discussed below.

Western leatherwood and most beautiful jewel-flower, CNPS List 1B species, and Presidio clarkia, a State- and federally listed species as well as a CNPS List 1B species, are known to occur in the Oakland watershed, and suitable habitat (particularly mixed evergreen forest for western leatherwood, and serpentine for Presidio clarkia and most beautiful jewel-flower) may be present at some of the proposed creek restoration sites. Potential restoration activities that may impact these species include grading, clearing, and grubbing of landscaped areas, as well as tree pruning and removal. Surveys of

existing habitat and vegetation would be conducted during the design phase and would identify special-status plants that require protection during restoration activities and that would be incorporated into the restored site design. Other native species would be incorporated into the design to the extent feasible. Implementation of the City's Standard Conditions of Approval (Conditions 35, 70 and 72) will further ensure that any special-status plant species found at creek restoration sites will be fully protected during project activities, reducing any potential impacts to a less-than-significant level.

Pacific pond turtles, a California Species of Special Concern, are known to occur in the Oakland watershed and suitable habitat may be present at some of the creek restoration sites, depending on their level of disturbance. In-stream restoration activities (e.g., creek bed grading, creek realignment, in-stream improvements) may result in direct mortality of Pacific pond turtles if present. Implementation of the City's Standard Conditions of Approval (Condition 73) and approval of all relocation plans and involved biologists by the CDFG will reduce potential impacts to Pacific pond turtles to a less-than-significant level.

Impact BIO-1 (Group 2): Construction of an observation structure at the 66th Avenue Gateway site may impact state or federally listed tidal marsh species. (S)

Suitable habitat for California black rail, California clapper rail, and salt marsh harvest mouse (SMHM) is present in Damon Marsh adjacent to the 66th Avenue Gateway site. Construction would not extend into existing marsh habitat. A fenced buffer of upland habitat at least 20 feet wide would be set up between marsh habitat and any nearby construction areas. Nevertheless, these species are known to use grasslands and other dense vegetation adjacent to marshes as escape cover during very high tides. As such, there is a small chance that they may occur within the construction footprint during very high tides, if present in Damon Marsh. In addition, construction noise could potentially disturb nesting tidal marsh rails since suitable habitat is present within 100 feet of the construction footprint.[34]

> Mitigation Measure BIO-1a (Group 2): Ground disturbance in the vicinity of Damon Marsh shall be conducted only when high tides are not at their winter or summer extremes, to reduce the likelihood that tidal marsh rails and SMHM will be present in the construction footprint. Ground disturbance shall be avoided during the highest tides of June–July and December–January (± one week each month). (LTS)
>
> Mitigation Measure BIO-1b (Group 2): Prior to ground disturbance, a qualified biologist experienced with SMHM exclusion procedures shall prepare a site-specific SMHM avoidance plan. At a minimum, the plan shall include (1) the installation of silt fencing around the entire portion of the work area (that is within 100 feet from the edge of the marsh) to exclude SMHM from entering, (2) the clearing of all ground vegetation within the fenced area, and (3) the relocation to Damon Marsh of any SMHM found during the vegetation removal effort. Construction work shall start as soon as possible (and no longer than one week) after vegetation has been cleared. All exclusion measures and initial ground

[34] This proposed project component has been designed and the City is currently requesting bids to construct it. Mitigation included in this environmental document has been incorporated into the bid documents.

disturbance activities shall be monitored by a biologist, who has the necessary state and federal permits to handle and relocate SMHM. (LTS)

Mitigation Measure BIO-1c (Group 2): To avoid potential disturbance to nesting tidal marsh rails, construction of the observation structure shall be conducted during the non-breeding season (September 1 through January 31), unless prior surveys indicate that marsh habitat within 100 feet of the construction footprint is not part of an active rail breeding territory. Such surveys must be conducted in accordance with a project-specific survey protocol prepared in accordance with the USFWS and CDFG guidelines. (LTS)

Impact BIO-2 (Group 2): Construction of the pile-supported boardwalks along the Waterfront Trail may impact fisheries resources within the Oakland Inner Harbor. (S)

Construction of the proposed boardwalks under the bridges at Park Street, Fruitvale Avenue, and High Street has the potential to impact fisheries resources within the Oakland Inner Harbor. Specifically, pile driving activities could directly impact Pacific herring and migrating salmonids, as well as other native San Francisco Bay fish species protected under the Magnuson-Stevens Act (i.e., Essential Fish Habitat [EFH]). Pile driving can generate intense underwater sound pressure waves that may injure and kill fish.[35]

Mitigation Measure BIO-2 (Group 2): To avoid adverse impacts to Pacific herring, federally listed salmonids (chinook salmon, coho salmon, and steelhead), and EFH, pile driving shall occur within the June 1 to November 30 work window in accordance with NMFS guidelines.[36] Any pile driving occurring outside this period will require informal or formal consultation with the NMFS (for listed salmonids and EFH) and CDFG (for Pacific herring) prior to the Corps' issuance of a Section 404 permit for impacts to waters of the U.S. (LTS)

(2) Riparian Habitat. Although the proposed creek restoration activities will ultimately result in improved and increased riparian habitat throughout the Oakland watershed, short-term impacts may include removal and/or pruning of existing native riparian trees and shrubs.

Due to the programmatic level at which the City-wide Creeks project group is being evaluated, the number of existing riparian trees and/or shrubs that would be removed is unknown. However, it is anticipated that removal of some riparian vegetation would be necessary at some sites to accommodate re-grading of creek channels, bank stabilization, to allow for re-vegetation with native vegetation and other activities. Implementation of the City's Standard Conditions of Approval (Conditions 34, 69, 70, and 72) will reduce potential impacts to riparian habitat to a less-than-significant level.

(3) Wetlands. Most components within the Lake Merritt and Lake Merritt Channel group (i.e., 12th Street Reconstruction, Lakeshore Avenue/El Embarcadero, E. 18th Street Pier Overlook,

[35] Hanson, J., M. Helvey, and R. Strach, editors. 2003. Non-fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures. National Marine Fisheries Service, Alaska Region, Northwest Region, Southwest Region. August.

[36] National Marine Fisheries Service (NMFS). San Francisco Bay Project Impact Evaluation System (PIES) website. <http://mapping.orr.noaa.gov/website/portal/pies/faqs.html> Accessed April 12, 2007.

Municipal Boathouse) have already obtained the proper regulatory permits (e.g., Corps permit, Water Board water quality certification, CDFG Lake or Streambed Alteration Agreement) for actions within or adjacent to waters of the U.S. and State. Proposed activities within the Waterfront Trail and City-wide Creeks groups have yet to obtain permits for potential impacts to waters of the U.S. and State, or BCDC approval, since planning has not yet been completed for these groups.

Impact BIO-3 (Groups 1, 2, and 4): Construction of some components within the Lake Merritt and Lake Merritt Channel, Waterfront Trail, and City-wide Creeks groups may impact waters of the U.S. and State. (S)

The proposed fixed pier boardwalks at Park Street, Fruitvale Avenue, and High Street along the Waterfront Trail would involve the square-drilling or driving of concrete piers within waters of the Oakland Inner Harbor, which is under the jurisdiction of the Corps, Water Board, and BCDC as waters of the U.S. and State. In addition, proposed restoration activities within the Oakland watershed would likely result in temporary, short-term impacts to waters of the U.S. and State.

> Mitigation Measure BIO-3a (Groups 1, 2, and 4): All Measure DD-funded activities within jurisdictional waters shall first obtain authorization from the appropriate agencies (Corps, Water Board, CDFG, and BCDC). At a minimum, each activity will likely require a Section 404 Corps permit and Section 401 water quality certification from the Water Board. Creek restoration activities may also require a CDFG Lake or Streambed Alteration Agreement, depending on site-specific conditions. Construction of the fixed pier boardwalks along the Waterfront Trail will require BCDC approval since it proposes construction over and filling of Bay waters (i.e., concrete piers). (LTS)
>
> Mitigation Measure BIO-3b (Groups 1, 2, and 4): Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). If feasible, replacement habitat shall be created/preserved in the same general area as the original impact. Off-site mitigation may be approved if the amount of required replacement habitat exceeds that which is available near a given impact site. A wetland mitigation and monitoring plan (MMP) shall be developed for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s). (LTS)

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. Several species of migratory waterbirds have been observed using the Lake Merritt Channel during the winter (approximately October through March), often in flocks of 40 to 70 birds (e.g., scaup, common goldeneye). A 2004 study of waterbird use and disturbance response within Berkeley's Aquatic Park found that disturbance sensitivity was positively related to flock size, with large flocks flushing more readily than smaller ones.[37] Although no such studies have been conducted at the Lake Merritt Channel, LSA observed a flock of approximately 50 common goldeneyes swimming away from a group of schoolchildren crossing the pedestrian bridge during the January 19 site visit, indicating sensitivity to disturbance. Human-caused disturbance negatively affects wintering ducks by causing the expenditure of energy (i.e., flying or moving away from the source of

[37] Avocet Research Associates. 2005. Aquatic Park, Berkeley, California: Waterbird Population and Disturbance Study, 2004. Prepared for the City of Berkeley, California. May 12. 41 pp.

disturbance) that would otherwise be used for behaviors necessary for survival, such as resting or feeding.[38] Repeated or periodic disturbance would cause a greater expenditure of energy and thus have a greater effect on wintering birds than singular events.

Both construction activities and future recreational use of the Channel have the potential to disturb wintering waterfowl. Although most construction would occur outside of the wintering period during April through September, some may be conducted during the period when waterbirds are most abundant (approximately October through March). Construction activities at the Lake Merritt Channel (e.g., grading, demolition of existing culverts, tree removal) during this time would disturb waterbirds by causing them to fly away from loud noises and/or workers and equipment. However, because construction would occur nearly daily, except weekends, for several months the birds would likely relocate to nearby areas on Lake Merritt or the Oakland Estuary during this time rather than returning to the disturbed area. This temporary displacement of birds to nearby suitable habitat areas would be a less-than-significant impact.

Impact BIO-4 (Group 1): The introduction of small boat traffic to the Lake Merritt Channel would result in increased disturbance levels to wintering migratory ducks and other waterbirds. (S)

As discussed above, wintering ducks are sensitive to a variety of human-caused disturbances, including both motorized and non-motorized boat traffic. Based on a review of several thousand scientific journal articles and books, Korschgen and Dahlgren[39] identified four categories of human disturbance to ducks. The second-most disruptive category was defined as over-water movement with little noise (sailing, wind surfing, rowing, and canoeing). If kayaks, rowboats, and other such vessels were allowed to use the Lake Merritt Channel during the wintering period (October–March), they would create a new source of disturbance to wintering ducks and other waterbirds in the channel. Because disturbance of waterbirds by recreational users could happen multiple times each day the birds are likely to experience frequent episodes of hazing. Many of the birds would likely relocate to nearby areas on Lake Merritt or the Oakland Estuary, rather than returning to Lake Merritt Channel, thus greatly reducing the average number of waterbirds using Lake Merritt Channel. In addition, the potential disturbance would continue for the life of the project. Therefore, this impact would be significant.

> Mitigation Measure BIO-4 (Group 1): Small boat use of the Lake Merritt Channel shall be restricted to the non-wintering period of April–September, when waterbird abundance is low. During the closure period, booms shall be placed across the outlet to the Channel from Lake Merritt and at the 7th Street dam to prevent boat access and signs shall be posted indicating that the Channel is closed to recreational users. This would reduce the impact to a less-than-significant level. (LTS)

(5) Regional Conservation Plans. The area covered by the Measure DD Implementation Project is not currently subject to any adopted habitat conservation plans or natural community conservation plans.

[38] Korschgen, C. E., and R. B. Dahlgren. 1992. Human disturbances of waterfowl: causes, effects, and management. Fish and Wildlife Leaflet 13.2.15.

[39] Op. Cit.

(6) Protected Trees. In order to create additional parkland along the south shore of Lake Merritt and make other improvements around the Lake, approximately 259 trees, including 129 protected trees, would be removed and 521 new trees and other landscaping would be installed to replace them. Approximately 510 existing trees would be retained. Overall, the trees would be replaced at about a 2:1 ratio, that is, two trees would be planted for each tree removed. Table IV.F-3 summarizes proposed tree removals and new plantings by project component within the Lake Merritt and Lake Merritt Channel project group. As part of the project design process the City engaged a certified arborist to evaluate the trees proposed for removal in this group. The arborist recommended preserving five trees by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project and the numbers in Table IV.F-3 reflect the preservation of these trees. The arborist's report is provided in Appendix I.

Table IV.F-3: Proposed Tree Removals for the Lake Merritt and Lake Merritt Channel Project Group

Project Component	Trees to be Retained[a]	Trees Proposed for Removal	Protected Trees Proposed for Removal	New Trees to be Planted	Ratio of Trees Planted to Trees Removed
Lakeside Drive/Municipal Boathouse	30	20	17	65	3.25
Lakeshore Avenue/El Embarcadero	90	24	6	135	5.4
12th Street Reconstruction	50	157	90	321	2.0
Lake Merritt Channel	340	58	16	0[b]	0
TOTAL	**510**	**259**	**129[c]**	**521**	**2.0**

[a] Numbers of trees are approximate. Totals include trees recommended for preservation or relocation by the certified arborist.
[b] No new trees would be planted along the Channel because the habitat type would be converted from landscaped urban parkland to wetlands and open water.
[c] Includes eight protected oak trees.
Source: HortScience, 2007.

The City of Oakland's Tree Preservation and Removal Ordinance (OMC Chapter 12.36) requires a permit for removal of protected trees. A permit is also required if work might damage or destroy protected trees. The project would comply with the Tree Preservation and Removal Ordinance and would obtain permits for the removal of any protected trees. In addition, the City considers other factors in determining significance for purposes of CEQA including: the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, with special consideration given to native trees, as discussed below.

The majority of protected trees to be removed are located in the 12th Street reconstruction area. Although protected trees are present in this area many of the trees are in poor or fair condition (see Appendix I); are in the landscaped median strip for 12th Street that is accessible only via rarely used pedestrian underpasses; or are in small planting strips within the parking lot for the Kaiser Convention Center (see Figure III-3). Most of the trees are non-native ornamental species. When the project components around Lake Merritt are looked at as a whole, about twice as many trees are retained in the project area as would be removed and approximately two trees would be planted for each tree removed. The new trees in the 12th Street reconstruction area would be part of proposed landscaped areas that would have direct pedestrian access to Lake Merritt and surrounding civic

buildings. The four components of Group 1 (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and Lake Merritt Channel) either retain more trees than they would remove and/or plant at least twice as many new trees as would be removed (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and 12th Street Reconstruction). Eight trees to be removed are protected native oak trees.

The project would not fundamentally conflict with the City of Oakland's Tree Preservation and Removal Ordinance and would therefore be a less-than-significant impact for the following reasons: approximately twice as many trees would be retained as would be removed; removed trees would be replaced at a 2:1 ratio; the majority of trees to be removed are in poor or fair condition; and many are located in a parking lot or an inaccessible median strip. In addition, because trees are being replaced at a 2:1 ratio many benefits lost by the removal of trees, such as aesthetics, energy conservation, reductions in stormwater runoff, improvements in air quality, and capture of carbon dioxide (a greenhouse gas) would be compensated for in a few years because of the large number of new trees being planted. The impacts of removing trees and the benefits of planting new trees in the Lake Merritt and Lake Merritt Channel group were estimated quantitatively using a computer application developed by scientists at the United States Department of Agriculture (USDA) Forest Service's Pacific Southwest Research Station to assess populations of street trees.[40] The results of this study are provided in Appendix I. Because the City would comply with the Tree Preservation and Removal Ordinance, the Lake Merritt and Lake Merritt Channel project components would have a less-than-significant impact. To reach this conclusion, the City considered the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, including native trees.

A small number of protected trees may require removal as part of the Waterfront Trail, Recreational Facilities, City-wide Creeks groups or other components of the Lake Merritt group (e.g., the Cleveland Cascade). The trees would be replaced in accordance with the City's Tree Protection Ordinance and Standard Conditions of Approval (Condition 32), which would reduce the impact to a less-than-significant level.

(7) Creek Protection Ordinance. Some proposed project components within the Lake Merritt and Lake Merritt Channel, City-wide Creeks and Waterfront Trail groups would be subject to the City's Creek Protection Ordinance. These project components would comply with the requirements of the Creek Protection Ordinance and would be constructed in accordance with a Creek Protection Permit issued by the City. Creek Protection Permits have already been obtained for the Lakeshore Avenue/El Embarcadero and East 18th Street Pier Overlook project components, for example.

Proposed project activities for creek sites range from manual activities such as hand planting, tree pruning or weed abatement, which would have no or minimal impacts, to activities that use heavy machinery such as creek bed or bank grading, culvert or concrete channel alterations, and creek realignment, as noted in Section III.C.4 of the Project Description. No mitigation is needed for manual activities with minimal impacts. For those activities that involve heavy machinery or equipment to excavate or move soil, to demolish structures, or to realign stream banks or waterways,

[40] USDA Forest Service. http://www.itreetools.org/street_trees/introduction_step1.shtm.

the City's Standard Conditions of Approval (Conditions 69 through 73) would ensure compliance with the Creek Protection Ordinance and reduce impacts to a less-than-significant level.

Creek Protection Permits will include requirements to minimize erosion and sedimentation in accordance with the Manual of Standards for Erosion and Sediment Control Measures, [41] as well as the mitigation measures described in Section IV.F.2.b, above (as applicable). In addition, Creek Protection Permits will require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) and C3 requirements pursuant to Water Board requirements. With the incorporation of these requirements into project approvals, proposed project components would have a less-than-significant impact on City creeks or other areas subject to the Creek Protection Ordinance.

[41] Association of Bay Area Governments. 1995. *Manual of Standards for Erosion and Sediment Control Measures.* Second edition. Association of Bay Area Governments, Oakland, California. 422 pp.

G. CULTURAL RESOURCES

This section describes the cultural resources setting and evaluates potential impacts of the Measure DD Project to those cultural resources that would result from project construction and implementation. Mitigation measures are recommended to avoid or reduce potentially significant impacts.

Cultural resources are sites, buildings, structures, objects, and districts that have traditional or cultural value for the historical significance they possess. Cultural resources thus include a broad range of resources ranging from archaeological materials, to historic roadways and railroad tracks, to buildings of architectural significance. CEQA requires that effects to cultural resources be considered in the planning process for discretionary projects.

The following section includes a description of the methods used to conduct the cultural resources analysis, and is followed by a brief historical overview of the project sites and surroundings. The section also describes the methods used for the cultural resources analysis, provides a description of the legislative context for the protection of cultural resources, and discusses whether the existing structures in the project site are considered historic resources.

1. Setting

This section presents the methods used to describe the cultural setting and existing conditions for the project. The prehistoric, ethnographic, and historical setting of the component areas and vicinity are then described.

a. Methods. Background research was conducted to: (1) identify previously recorded or otherwise known cultural resources and cultural resource studies in or adjacent to the project areas; and (2) obtain information about the archaeology, ethnography, and history of the project areas. Field visits were made to some of the component areas to assess the general cultural resources sensitivity of those areas and potential impacts to resources. Consultation was conducted with organizations that may have information on cultural resources in the project areas.

(1) Records Searches. On January 12, 2007, a records search of the project component areas and a ¼-mile radius around them was conducted at the Northwest Information Center (NWIC) (File #06-1083) of the California Historical Resources Information System, Sonoma State University, Rohnert Park. The NWIC, an affiliate of the State of California Office of Historic Preservation (OHP), is the official State repository of cultural resource records and reports for Alameda County. On December 20, 2006 and January 24, 2007, records searches were conducted at the Oakland Cultural Heritage Survey (OCHS) for the project areas. The OCHS is a division of the Oakland City Planning Department and has completed Historic Resources Inventory and/or California Department of Parks and Recreation 523 forms for numerous buildings and structures of historical interest within the City.

(2) Literature Review. LSA reviewed publications and maps for archaeological, historical, ethnographic, and environmental information about the project areas and vicinity.

(3) Field Review. Field reviews of portions of the Lake Merritt and Lake Merritt Channel group and Waterfront Trail group were completed on December 12 and 20, 2006. Field reviews were

undertaken to determine the existing conditions and general cultural resource sensitivity of the project areas.

(4) Consultation. Consultation with the Native American Heritage Commission, Alameda County Historical Society, and Oakland Heritage Alliance occurred as follows:

Native American Heritage Commission. On January 17, 2007, a letter and maps depicting the project component areas were sent to the Native American Heritage Commission (NAHC) in Sacramento requesting a review of their sacred lands file for any Native American cultural resources that might be affected by the proposed project. Debbie Pilas-Treadway, NAHC Environmental Specialist III, responded in a faxed letter on January 22, 2007, that a review of the sacred land file did not indicate any "Native American cultural resources in the immediate project area."

Alameda County Historical Society. On January 17, 2007, a letter and maps depicting the project areas was sent to the Alameda County Historical Society (Society), requesting information or concerns regarding historical sites in the project areas. On February 2, 2007, LSA contacted the Society via e-mail to determine if it has any concerns or information on historical sites in the project areas. No response from the Society has been received to date.

Oakland Heritage Alliance. On January 17, 2007, a letter and maps depicting the project areas were sent to Naomi Schiff of the Oakland Heritage Alliance (Alliance) requesting information or concerns regarding historical sites in the project areas. On February 2, 2007, LSA contacted Ms. Schiff via e-mail to determine if the Alliance has any concerns or information on historical sites in the project areas. Ms. Schiff responded on February 2, 2007 via e-mail. Ms. Schiff provided input on issues that she would like covered by the EIR but did not provide specific information or concerns on historical sites within the scope of the EIR.[1]

b. Cultural Overview. The prehistoric, ethnographic, and historical contexts for the project and vicinity are described below.

(1) Prehistory and Ethnography. The Paleo-Archaic-Emergent cultural sequence developed by Fredrickson[2] is commonly used to interpret the prehistoric occupation of Central California. The sequence consists of three broad periods: the Paleoindian (Paleo) Period (10,000-6000 B.C.); the three-staged Archaic Period, consisting of the Lower Archaic (6000-3000 B.C.), Middle Archaic (3000-500 B.C.), and Upper Archaic (500 B.C.-A.D. 1000); and the Emergent Period (A.D. 1000-1800).

The Paleo Period began with the first entry of people into California. These people probably subsisted mainly on big game, minimally processed plant foods, and had few or no trade networks. Current research, however, is indicating more sedentism, plant processing, and trading than previously believed. During the Lower Archaic, milling stones appear in abundance and hunting is less important

[1] Ms. Schiff stated in regards to the historical Lakeside Park Bandstand that "A number of people have been advocating that the city fix the access elevator mechanism rather than build an unattractive ramp." No modifications or repairs to the Lakeside Park Bandstand are included in Measure DD funding and this action is outside of the scope of this EIR.

[2] Fredrickson, David A., 1974. Cultural Diversity in Early Central California: A View from the North Coast Ranges. *Journal of California Anthropology* 1(1):41-53.

than plant foods. Artifacts are made predominantly from local materials, suggesting that few if any extensive trade networks were established at this time. During the Middle Archaic, the subsistence base begins to expand and diversify with a developing acorn economy, as evidenced by the mortar and pestle, and the growing importance of hunting. Status and wealth distinctions are evidenced in the Upper Archaic archaeological record; regional exchange networks are well established at this time with exchange of goods and ideas, such as obsidian and Kuksu ceremonial practices involving spirit impersonations. Increasing social complexity continued during the Lower Emergent. Territorial boundaries were well established by this time with regularized inter-group exchanges involving more and varied goods, people, and ideas. Bow and arrow technology was also introduced. By the Upper Emergent, a monetary system based on the exchange of clamshell disk beads was established. Native population reached its zenith during this time, as evidenced by high site densities and large village sites in the archaeological record.

Historically, archaeological excavations along the eastern San Francisco bayshore have focused on shellmounds. These sites contain a rich, diverse assemblage of dietary remains, artifacts, and human remains. Excavations at two major shellmounds near the project area—the Emeryville Shellmound, CA-ALA-309, and the West Berkeley Shellmound, CA-ALA-307—have helped refine our understanding of the Bay Area's earliest inhabitants. Excavations at the Emeryville Shellmound[3, 4, 5] have identified hundreds of human burials, groundstone (e.g., mortars, pestles, and "charmstones"), flaked stone (e.g., obsidian and chert projectile points and flaking debris), bone tools, and dietary debris, including clams, mussels, oysters, and land and sea mammal bones. Uhle,[6] Nelson,[7] and Bennyhoff[8] have identified temporal changes in artifact types, dietary refuse, and human internments in multiple strata at the site. Excavations at the West Berkeley Shellmound[9] have identified an assemblage as diverse as the Emeryville Shellmound's, with two cultural components at the site. The oldest component at the West Berkeley Shellmound is believed to predate 2000 B.C. and the earliest known occupation of the Emeryville Shellmound.[10]

A shellmound, CA-ALA-5, was recorded in or near the Lake Merritt and Lake Merritt Channel group around 1910 by archaeologists Nels Nelson and Arnold Pilling. Little is known about this site,

[3] Nelson, Nels C., 1996. *Excavation of the Emeryville Shellmound, 1906: Nels C. Nelson's Final Report*, transcribed and prefaced by Jack M. Broughton. Contributions of the University of California Archaeological Research Facility, Number 54. Berkeley.

[4] Schenck, W. Egbert, 1926. The Emeryville Shellmound Final Report. *University of California Publications in American Archaeology and Ethnology* 23(3):147-282. Berkeley.

[5] Uhle, Max, 1907. The Emeryville Shellmound. *Univeristy of California Publications in American Archaeology and Ethnology* 7(1):1-106. Berkeley.

[6] Ibid.

[7] Nelson, Nels C., 1996.

[8] Bennyhoff, James A., 1986. *The Emeryville Site, Viewed 93 Years Later.* In *Symposium: A New Look at Some Old Sites: Papers from the Symposium Organized by Francis A. Riddell*. Coyote Press Archives of California Prehistory 6:65-74. Coyote Press, Salinas, California.

[9] Wallace, William J., and Donald W. Lathrap, 1975. *West Berkeley (CA-ALA-307): A Culturally Stratified Shellmound on the East Shore of San Francisco Bay*. Contributions of the University of California Archaeological Research Facility, Number 29. Berkeley.

[10] Wallace, William J., and Donald W. Lathrap, 1975:55, 58.

including its specific location. There is a general lack of study of prehistoric sites in Oakland, and the prehistory of the city is poorly understood.

The project area is situated within territory occupied by Costanoan (also commonly referred to as Ohlone) language groups. Ohlone territories were comprised of one or more land holding groups that anthropologists refer to as "tribelets." The tribelet, a nearly universal characteristic throughout native California, consists of a principle village, which was occupied year round, and a series of smaller hamlets and resource gathering and processing locations occupied intermittently or seasonally.[11] Population densities of tribelets ranged between 50 and 500 persons, which were largely determined by the carrying capacity of a tribelet's territory. According to Milliken,[12] the *Huchiun* tribelet occupied the Oakland area at the time of Spanish contact.

By the late eighteenth century, Spanish exploration and settlement of the Bay Area transformed Ohlone culture. Spanish settlers moved into northern California and established the mission system. Mission records indicate that the first *Huchiun* was baptized in 1787 with the first large group from that tribelet arriving at Mission San Francisco in the fall of 1794.[13] Following the secularization of the missions in 1834, many Ohlone worked as manual laborers on ranchos.[14]

(2) General Historical Background. The project components are entirely within the Rancho San Antonio land grant, which was originally granted to Luis Maria Peralta on August 3, 1820 for his service to the Spanish government. His 43,000-acre rancho included what are now the cities of Oakland, Berkeley, Alameda, and parts of San Leandro and Piedmont. Peralta's land grant was confirmed after Mexico's independence from Spain in 1822, and this title was honored when California entered the Union by treaty in 1848. Despite this acknowledged title, squatters moved in to use the vast amounts of Peralta's undeveloped land. Cattle were stolen and slaughtered, and trees were removed by squatters and people traveling to and from the gold fields.[15] Peralta Hacienda Historical Park at 34th Avenue in Oakland incorporates the headquarters of Luis Maria Peralta's Rancho San Antonio.

In 1850, Andrew Moon, Horace W. Carpentier, and Edson Adams built a house on Peralta's property at the foot of Broadway, near the banks of an estuary. This house site was in what is now Jack London Square. Vicente Peralta attempted to legally evict the group, but eventually relented and allowed them to lease the land. Instead of complying with the terms of their lease, Moon, Carpentier, and Adams hired Julius Kellersberger, a Swiss engineer, to survey the land and lay out the town that became Oakland. The area was encompassed by Fallon, Market, First, and Fourteenth streets. The City of Oakland was incorporated in 1852, and officially recognized by the state in 1854.[16]

[11] Kroeber, Alfred L., 1955. Nature of the Land-Holding Group. *Ethnohistory* 2:303-314.

[12] Milliken, Randall, 1995:243. *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area, 1769-1810.* Ballena Press, Menlo Park, California.

[13] Milliken, Randall, 1995:243.

[14] Levy, Richard, 1978:486.

[15] Hoover, Mildred, Hero E. Rensch, Ethel G. Rensch, and William N. Abeloe, 1990:18-19. *Historic Spots in California*. Stanford University Press, Stanford, California.

[16] Ibid.

Oakland grew around its waterfront, with development limited only by the available modes of transportation. Steam ferry service to San Francisco was established in 1850, and by 1869 the first horse-car followed a route from the estuary up Telegraph Avenue to 40th Street. On November 8, 1869, the transcontinental railroad's first west bound trip rolled through Oakland along Central Pacific tracks, which terminated at the new 7th Street station. By 1891, Oakland's first street car ran along Broadway to the City of Berkeley.[17]

Subsequent to the devastation of the 1906 earthquake and fire in San Francisco, numerous refugees lived for months in tents set up in Lakeside Park on the shores of Lake Merritt. The influx of people to Oakland escaping the devastation from across the bay prompted the development of new residential areas in Oakland to accommodate displaced San Francisco residents. Older neighborhoods became more densely populated as new apartment buildings and related growth became part of Oakland's residential fabric.[18]

Throughout the 20th century, commercial enterprises and industrial development, particularly the Port of Oakland and the Oakland Municipal Airport, played a vital role in Oakland's growth. During World War II, the Port provided land and facilities to the Army and Navy. By 1943, Oakland had become the largest shipping center on the West Coast and within two decades was the largest container terminal on the West Coast. As suburbs grew outward during the 1950s, the inner core of the City began to decline as residents left for the outlying areas. The perception of Oakland, as with many large cities during the 1960s and 1970s, was that of a neglected urban core with high unemployment, racial tension, and reduced economic opportunity.[19] This trend began to reverse in the 1980s as reinvestment and redevelopment helped to invigorate the City's image and prospects. In 1995, California's "Golden Triangle," which included Oakland, San Jose and San Francisco, was named by *Fortune Magazine* as the best place to do business in the United States.[20]

(3) Group-Specific Historical Background. The following section describes the historical background of each group of project components.

Lake Merritt and Lake Merritt Channel (Group 1). When the City of Oakland was incorporated in 1852, what is now Lake Merritt consisted of a creek-fed tidal slough which opened to the Bay.[21] In 1854 Dr. Samuel Merritt purchased land around the estuary and, in an attempt to increase the value of his land and allow for its future development,[22] funded the construction of a dam north of the original 12th Street bridge in 1869 across the tidal canal to create a lake. Governor Henry

[17] Oakland History Room of the Oakland Public Library, 2003. *Oakland History Timeline*, revised by the City of Oakland Community and Economic Development Agency <www.oaklandnet.com/celebrate/historytimeline.htm>. Website accessed 9 January 2007.

[18] Woodbridge, Sally, 1984:11-12. Historical and Architectural Resources. In *Oakland Central District Development Program*. City of Oakland Planning Department, Oakland, California.

[19] Bagwell, Beth, 1982. *Oakland, Story of a City*. Presidio Press, Novato, California.

[20] Oakland History Room of the Oakland Public Library, 2003.

[21] U.S. Coast Survey, 1852. U.S. Coast Survey, San Francisco Bay, Contra Costa No. V. map, A.D. Bache, Superintendent. U.S. Coast Survey, Washington D.C.

[22] Camron-Stanford House Museum, 2003. *Lake Merritt* <http://www.cshouse.org/Pages/lake_merritt.html>. Website accessed 9 January 2007.

Haight signed a bill the following year designating Lake Merritt a wildlife refuge, the first one in the United States.

During the 19th century, the Lake Merritt Channel project area and points around Lake Merritt consisted of tidal marshland.[23] These areas were filled and developed during the early decades of the 20th century.

By 1903 the Lake Merritt Channel was crossed by the Southern Pacific and the Western Pacific railroads and the 8th and 12th Street bridges. The land between the channel banks was labeled "Marsh. To be city farm."[24] By 1911 the "city farm" had become Peralta Park. The Great Western Power Station, boatyards, lumber yards, and residences were constructed in the area south of the park.

The City Beautiful movement influenced the development of Lake Merritt and surrounding area into the urban park residents and visitors enjoy today. This Progressive movement, popular at the turn of the previous century, sought to use beautification and monumental architecture to rectify the perceived social decay of urban centers. Oakland Mayor Frank K. Mott, a proponent of the City Beautiful movement, wanted to create parkland surrounding Lake Merritt. To this end, the City purchased and removed private residences surrounding the lake, save for the Camron-Stanford House[25] constructed on the western shore of Lake Merritt in 1879. Between 1907 and 1915 the road around Lake Merritt was paved and some the lake's distinctive buildings and structures, including the Pergola (1913), East 18th Street Boat Landing (1914), Pumping Station/Municipal Boathouse (1908-1909, 1914-1917), and Canoe/Sailboat House (1915), were constructed.

During the 1920s and 1950s, other improvements were made in the Lake Merritt project area. In 1923 the Lake was dredged and its fill used to create the first of five "bird islands" at the northern end of the Lake. That same year, the Cleveland Cascade, an Art Deco inspired waterfall that plunged from Cleveland Heights to Lakeshore Avenue, was built based on a design of noted landscape architect and engineer Howard Gilkey. Two years later, the Necklace of Lights, consisting of 126 Florentine light standards surrounding Lake Merritt, was completed.

During World War II, an area north of the Southern Pacific Railroad tracks, near the mouth of the Lake Merritt Channel, was the site of Auditorium Village, a federal housing project for white defense workers for the Moore and Kaiser shipyards. It was one of several segregated housing projects on the bay flats. Federal law required the removal of these housing projects after the war.

The 1950s witnessed more notable additions and alterations to the Lake Merritt project area. Construction of Children's Fairyland in Lakeside Park was completed in 1950. Children's Fairyland was purportedly an inspiration to Walt Disney, who visited Children's Fairyland for ideas for Disneyland. Children's Fairyland includes several storybook themed sets, including Pinocchio's Castle, Thumbelina, and the Three Little Pigs, and is home to the Open Storybook Puppet Theater, the oldest continuously operating puppet theater in the United States. The Frickstad Viaduct was built

[23] Sowers, Janet M., 2000. *Creek & Watershed Map of Oakland & Berkeley*. Oakland Museum of California, Oakland.

[24] Sanborn Map Company, 1902. Oakland.

[25] Camron-Stanford House Museum, 2003. *The City Beautiful Movement* <http://www.cshouse.org/Pages-/city_beautiful.html>. Website accessed 9 January 2007.

in the early 1950s across the Lake Merritt dam at 12th Street to relieve traffic congestion at the southern end of the Lake. In 1954 the Canoe (Sailboat) House in Lakeside Park was renovated, obscuring much of the building's original Mediterranean style design.

Waterfront Trail (Group 2). Oakland Harbor terminated west of the present site of the Park Street Bridge in 1878 and Alameda was attached to the mainland.[26] Prior to 1892, most of the proposed Waterfront Trail project area was under water or on mud flats. Gradually the mudflats were covered with fill, the shoreline was extended into the Oakland Harbor and the San Francisco Bay, and a ship channel was dredged around the southern part of Alameda, opening Brooklyn Basin to San Leandro Bay. Today the ship channel has been widened and is a tidal canal.

The western part of the Estuary Park site was filled tidal marsh by 1878.[27] As early as 1903, the land between the Southern Pacific Railroad tracks and bay had been subdivided but undeveloped except for a few boathouses on the shore. Seven years later the eastern three-quarters had been filled and coal industry buildings occupied the land. In 1949 the area that was to become Estuary Park was the site of a lumber yard.

The project areas on the Brooklyn Basin were inundated until the second decade of the 20th century. Filled land begins to appear on the 1915 U.S. Geological Survey topographic quadrangle *Concord, Calif.* Embarcadero Cove was a boatyard and marina prior to its transformation into an office and restaurant complex in 1969-1973. At that time three 1870s houses, the 1900s East Oakland train station, and the 1903 Oakland Harbor Lighthouse were relocated to Embarcadero Cove. Other existing boat and lumber yard buildings were remodeled and landscaping was installed to create a historical nautical setting. In November 1909, Oakland voters approved a $2.5 million bond measure for construction of a municipal port. Livingston Pier, completed in 1912, was the first construction associated with Oakland municipal port improvements and was used as a pier for lumber and general cargo. Livingston Pier first appears on the 1911 Sanborn Insurance Map as "Municipal Pier," extending to the limit of the US Pierhead Line opposite Government (now Coast Guard) Island in the Brooklyn Basin.

The Cryer Site Waterfront Trail segment includes the site of the former Cryer and Sons Boatyard that, among other activities, maintained and repaired Coast Guard yachts during and after World War II.[28]

The original High Street, Park Street and Fruitvale Avenue bridges were built by the U.S. Government between 1892 and 1894 in exchange for permission and rights-of-way to dredge the channel between San Antonio Creek and San Leandro Bay. The present High Street and Park Street bridges were constructed in 1939 and 1935, respectively. The current Fruitvale Avenue Bridge was completed in 1974.

Recreational Facilities (Group 3). The project area located at 365 45th Street includes the Studio One Art Center. The Ladies' Relief Society constructed a children's home (now the Studio

[26] Thompson & West, 1878. *Official Historical Atlas Map of Alameda County*. Thomopson and West, Oakland, California

[27] Ibid.

[28] Tibbets, Ross, 2003. Yachts a Way of Life for this Dane. The Log: SoCal's #1 Boating and Fishing Newspaper. http://www.thelog.com/news/newsview.asp?c=84998. Accessed February 1, 2007.

One Art Center) in 1906-1907 to replace the previous home which was partially destroyed by fire in April 1906. The rebuilt Shingle Style building retained many of the elements of the previous children's home that stood at that location since 1894, including the basic footprint, foundation, and first-story brickwork. The Ladies' Relief Society operated the children's home until about 1940, when it was used during World War II as a military police facility, and was acquired by the City in 1948 for recreation programs. Today, the City owned property is considered historically significant within the historical contexts of children's homes and community recreation and arts programs.[29]

The East Oakland Sports Complex project area located at Edes and Jones Avenues includes the Brookfield School, an International Style building constructed around 1951 during the post-war population boom. The construction boom at this time coincided with a shift in American architecture, which was moving away from classical and medieval revival styles and toward modernism, as evidenced by Brookfield School. Considering the large number of post-war schools built, relatively few remain intact today. The building is "a superior example of [a] postwar school building in Oakland."[30]

City-wide Creeks (Group 4). Prior to 1852 and the founding of the City of Oakland, all creeks in Oakland ran free in their natural courses, and although Oakland was surveyed and subdivided very rapidly throughout the remainder of the 19th century, maps published during the early period show the creeks flowing in a relatively natural setting. According to Sanborn Map Company insurance maps, by 1902 there was sufficient infrastructure in the flatlands of Oakland to bury, reroute, drain, and channelize creeks flowing under streets and developed land.

Creeks in the Oakland hills flowed unchecked on ranch lands until 1867 when watersheds began to be channelized and dammed for municipal water supply. Reservoir construction continued until the mid-1960s.

There are recorded resources adjacent to the proposed creek restoration sites. Peralta Hacienda Historical Park, which includes the locations of Peralta family residences constructed in 1821, 1840, and 1870 between Sausal and Peralta Creeks, as well as historical archaeological sites related to the Peralta rancho. The small adobe Boy Scout Hut in Dimond Park is reportedly constructed of bricks from the original Antonio Maria Peralta home built in 1821. The restoration sites include or are adjacent two historical resources, the ca. 1860s J. Mora Moss Cottage in Mosswood Park, and Glen Echo Creek Park, dating to c. 1905. The Gothic Revival–style J. Mora Moss Cottage is an Oakland City Landmark and is on the National Register of Historic Places. A natural stretch of Glen Echo Creek runs through the center of Oak Glen Park. As early as 1913, neighbors and the city have been cooperating to maintain the pastoral quality of the creek. Landscape architect Oscar Prager envisioned the park to be one link in a series of creekside parks as part of the City Beautiful movement in the early years of the twentieth century.[31]

[29] English, John S., 2005. National Park Service form 10-900, *National Register of Historic Places Registration Form* for the Ladies' Relief Society Children's Home.

[30] Oakland Cultural Heritage Survey, 1997. California Department of Parks and Recreation form DPR 523 records for the Brookfield School.

[31] Oakland Cultural Heritage Survey, 1981. California Department of Parks and Recreation form DPR 523 records for Oak Glen Park (Glen Echo Creek Park).

c. Existing Conditions. The existing conditions for each project group, as they relate to cultural resources, are described below.

(1) Lake Merritt and Lake Merritt Channel (Group 1). Three recorded prehistoric cultural resources are within the Lake Merritt and Lake Merritt Channel project areas (see Table IV.G-1). The location of one of these archaeological resources, CA-ALA-5/P-01-000026, a prehistoric shellmound recorded by Nels Nelson and Arnold Pilling around 1910 in the Lake Merritt project area, is uncertain. Nelson and Pilling noted buildings on CA-ALA-5, which was described as being "on SW side of Lake Merritt, near outlet." As currently mapped at the NWIC, however, CA-ALA-5 is plotted on the southeast side of Lake Merritt near Lakeshore Avenue. In December 2004 Suzanne Baker and Michael Smith of Archaeological/Historical Consultants visited the mapped location of CA-ALA-5 and did not identify surface evidence of an archaeological site. Baker and Smith did note, however, the possibility of a subsurface deposit. Baker and Smith also recorded P-01-010693 and P-01-010694, shell scatters within the Lake Merritt Channel and 12th Street project areas. It is possible that P-01-010693 and P-01-010694 represent fill or redeposited archaeological materials.[32] P-01-010693 is in the Lake Merritt Channel area and its location was once a wetland (based on a review of historical literature and shoreline maps) that was filled in during the early 20th century. P-01-010693 is, therefore, believed to be a fill deposit and not a significant archaeological resource. Formal study, however, would be required to verify this. None of the prehistoric or putatively prehistoric resources in the Lake Merritt and Lake Merritt Channel group have been evaluated for their eligibility for listing in the California Register of Historical Resources (California Register).

A historical archaeological site, P-01-010532, was identified at the intersection of 20th and Harrison streets during subsurface monitoring for a fiber optic cable conduit. This site, which consisted of historical refuse intermixed with demolition debris and dredging materials, lacks integrity and does not appear to be eligible for the California Register.

Significant historical cultural resources have been identified in the Lake Merritt area. The Lake Merritt Wild Duck Refuge, recognized as the first designated wildlife refuge in the United States, is listed within the National Register of Historic Places (NRHP), is a National Historic Landmark (NHL), and a City Landmark. In 1986, the OCHS recorded the Lake Merritt District, which consists of Lake Merritt, adjacent parklands, and buildings and structures within and adjacent to lake parklands over 50 years old. Included in the district are components analyzed by the current EIR: Lakeside and Snow parks, the Municipal Boathouse, the Sailboat house, Pergola and Colonnade, the Cleveland Cascade, and the East 18th Street Pier. The OCHS considers the district to be an "Area of Primary Importance" (API), a designation that indicates a district that appears eligible to the National Register. Renovation work on the Municipal Boathouse and Pergola and Colonnade is at or near completion, while restoration of the Cleveland Cascade and East 18th Street Pier will begin soon. The Sailboat House was renovated in the 1950s, which greatly compromised its historical integrity. Project funds may be used to restore its appearance and integrity to approximate its historical façade, although there are no specific plans for renovating the building at this time. The project would have a beneficial effect on the historical Lake Merritt District by restoring and repairing some of its most prominent contributors.

[32] Baker, Suzanne, and Michael Smith, 2004. California Department of Parks and Recreation form DPR 523 records for P-01-010693 and P-01-010694.

Table IV.G-1. Recorded Cultural Resources within the Project Areas

Resource	Period	Resource Description	Current Status[a]
Lake Merritt and Lake Merritt Channel (Group 1)			
CA-ALA-5/ P-01-000026	Prehistoric	Shellmound	Not evaluated
P-01-003685	Historic	Lake Merritt Wild Duck Refuge	NRHP, NHL, City Landmark
P-01-010532	Historic	Historical refuse intermixed with demolition debris and dredging spoils	Not eligible to CRHR
P-01-010693	Prehistoric?	A mussel and clam scatter; possibly fill	Not evaluated
P-01-010694	Prehistoric?	A shell scatter; possibly fill	Not evaluated
Lake Merritt District	Historic	Lake Merritt; parklands; and buildings within lake parklands and adjacent buildings over 50 years old	Appears eligible to CRHR
Waterfront Trail (Group 2)			
Park St. Bridge	Historic	Bascule pony truss bridge	Appears eligible to CRHR
High St. Bridge	Historic	Bascule pony truss bridge	Appears eligible to CRHR
Embarcadero Cove	Historic	Historic district consisting of nine major buildings and several accessory structures	Not evaluated
Livingston Pier	Historic	Reinforced concrete pier	Not evaluated
Cryer & Son Building[b]	Historic	Cryer & Son Boat Builder building	Not evaluated
Recreational Facilities (Group 3)			
P-01-001275	Historic	Ladies' Relief Society Children's Home (Studio One)	NRHP
Brookfield School	Historic	International Style building at 401 Jones Ave.	Not evaluated
City-wide Creeks[c] (Group 4)			
CA-ALA-585H/ P-01-002244	Historic	Rancho San Antonio headquarters	NRHP; State Landmark; City Landmark
P-01-004668	Historic	J. Mora Moss House	City Landmark
Oak Glen Park[d]	Historic	Glen Echo Creek Park, bridge, pergola, native trees, Richmond Blvd. residences	Appears eligible to CRHR

Notes:

[a] NRHP = National Register of Historic Places; NHL = National Historic Landmark; CRHR = California Register of Historical Resources.

[b] The Cryer & Son Builder building was identified as a building of "secondary importance" (rating C3) by the OCHS and is, therefore, a "Potential Designated Historic Property." The Cryer building was not evaluated for its eligibility for inclusion in the California Register of Historical Resources by the current study.

[c] At the time of writing, project specific maps and project descriptions for the creek acquisition and restoration sites are unavailable. It is not known at this time if cultural resources will be directly affected by the proposed project, and the City-wide Creeks group of projects will be analyzed at a program level in this EIR.

[d] OCHS has assigned Oak Glen Park and its associated elements a rating of A+.

(2) Waterfront Trail (Group 2). The proposed Oakland Waterfront Trail development areas include cultural resources that appear eligible for listing in the California Register and/or warrant consideration under the Historic Preservation Element of the City's General Plan. The proposed waterfront trail intersects the High Street (33C0026) and Park Street (33C0027) bridges, built in 1939 and 1935, respectively, which are the longest bascule span bridges in California. In 1999, the California Department of Transportation (Caltrans) completed a historical evaluation of these bridges

and assigned both a "Category 2" designation: "determined eligible for the National Register".[33] The proposed Trail segments at High Street and Park Street would not have a significant effect on these resources as the Trail would not substantially affect the bridges' setting or original construction. The preferred alignment for the Trail at these locations would route the path beneath the bridges and would remove and replace the existing fender system. The existing fender system of both bridges replaced the previous timber fender system in the 1970s and, therefore, does not date to, nor contribute to, the bridges' period of significance.[34, 35, 36, 37]

The Embarcadero Cove Waterfront Trail segment includes a "future ASI" ("Area of Secondary Importance"), as noted on the OCHS survey maps, and is of local importance as an early adaptive reuse and moving project, a predecessor of downtown Oakland's Preservation Park.[38] At the southern end of Embarcadero Cove is Livingston Pier, a C3 rated structure of "secondary importance" that is not within an historic district. According to the Historic Preservation Element of the Oakland General Plan, properties of secondary importance have visual, architectural, or historical value that warrant recognition but do not appear to be individually eligible for the National Register. Some may be eligible as City landmarks and/or for addition to the California Register, however, and properties with "C" ratings are considered "Potential Designated Historic Properties" under the City's Historic Preservation Element (refer to section G-C(2) below for a discussion of the City's historical property ratings system). The 1912 pier was the first Oakland—and possibly entire East Bay—waterfront pier constructed of reinforced concrete.[39] The Cryer development area includes the "Cryer & Son Boat Builder" at 1899 Dennison Street, an early 1900s building rated C3.

(3) Recreational Facilities (Group 3). The Studio One Art Center at 365 45th Street was recently listed in the National Register due to its association with The Ladies' Relief Society Children's Home. At the time of writing this section, renovation of the Studio One Art Center, which consists of seismic reinforcement, new heating, ventilating, lighting, plumbing systems, and interior and exterior finish work, has been permitted by the City and is nearing completion. Seismic renovations at Studio One have been done in accordance with the Secretary of the Interior's *Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*[40] and, pursuant to *CEQA Guidelines* Section 15331, are categorically exempt.

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[33] Caltrans Inventory of Metal Truss, Movable, and Steel Arch Bridges.

[34] Busby, Colin I., and Melody E. Tannam, 2000. *Historic Property Survey Report, High Street Bridge (#33C026), Seismic Retrofit Project, Alameda County, California.* Basin Research Associates, Inc., San Leandro, California.

[35] Hill, Ward, 2000. *Finding of Effect (No Adverse Effect), High Street Bridge (#33C026), Seismic Retrofit Project, Alameda County, California*. Basin Research Associates, Inc.

[36] Busby, Colin I., and Melody E. Tannam, 2000. *Historic Property Survey Report, Park Street Bridge (#33C027), Seismic Retrofit Project, Alameda County, California.* Basin Research Associates, Inc., San Leandro, California.

[37] Hill, Ward, 2000. *Finding of Effect (No Adverse Effect), Park Street Bridge (#33C027), Seismic Retrofit Project, Alameda County, California*. Basin Research Associates, Inc.

[38] Oakland Cultural Heritage Survey, 1998. State of California Department of Parks and Recreation form DPR 523 records for the Embarcadero Cove District.

[39] Minor, Woodruff, 2000:21. *Pacific Gateway: An Illustrated History of the Port of Oakland.* Port of Oakland.

[40] Weeks, Kay D., and Anne E. Grimmer, 1995. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, & Reconstructing Historic Buildings.* National Parks Service, Washington, D.C.

The East Oakland Sports Complex project area includes Brookfield Elementary School, which the OCHS assigned a rating of C3 to in 1997.

(4) City-wide Creeks (Group 4). A creek restoration site along Peralta Creek includes the Rancho San Antonio headquarters at Peralta Hacienda Historical Park. This resource is listed in the National Register and has Landmark status at the State and City level. The resource includes the locations of Peralta residences constructed in 1821, 1840, and 1870 as well as historical archaeological deposits that appear eligible for listing in the California Register.[41]

The Glen Echo Creek restoration sites include, or are adjacent to, two historical resources. The J. Mora Moss Cottage, a ca. 1860s Gothic Revival cottage in Mosswood Park, is a City Landmark which has also been assigned a rating of 3S—"appears eligible to the National Register as an individual property"—in the *Directory of Properties in the Historic Property Data File*.[42] Oak Glen Creek Park along Richmond Boulevard has been assigned a rating of A+ by the OCHS. As recorded by the OCHS, Glen Echo Creek Park includes the ca. 1905 park, bridge, pergola, paths, native riparian vegetation, and buildings along Richmond Boulevard.

Archaeological studies have been done of portions of the creeks proposed for restoration, including Temescal Creek and associated tributaries,[43, 44, 45] Glen Echo Creek,[46, 47] Courtland Creek,[48] San Leandro Creek,[49] and Sausal Creek.[50, 51] None of these studies identified historical resources at the

[41] Costello, Julia G., and Charlene Duval, 2001. *Historical Archaeology at the Peralta Hacienda Historical Park (P-01-002244). Phase 3 Plan Update, Oakland, California.* Foothill Resources, Ltd., Mokelumne Hill, California.

[42] California Office of Historic Preservation, September 18, 2006. *Directory of Properties in the Historic Property Data File.* California Office of Historic Preservation, Sacramento.

[43] Chavez, David, 1981. *Caldecott Heights Development Area.* David Chavez, Consulting Archaeologist, San Francisco, California.

[44] Dietz, Stephen A., 1978. Letter report to Steven D. Billington, City Planning/Environmental Research re: archaeological survey of the Lands of Varney, Oakland, California. Archaeological Consulting and Research Services, Inc., Santa Cruz, California.

[45] Garaventa, Donna M., 1991. *Emergency Culvert Clearance in the Oakland Hills, City of Oakland, Alameda County, California*. Basin Research Associates, San Leandro, California.

[46] Busby, Colin I., 1998. *Cultural Resources Assessment, Glen Echo Creek (Zone 12, Line B) Drainage Improvement Project from about 28th to 30th Streets, City of Oakland, Alameda County, California.* Basin Research Associates, San Leandro, California.

[47] Busby, Colin I., 2004. *Archaeological Assessment Report, Glen Echo Creek Restoration Project (Zone 12, Line B), 235 30th Street, City of Oakland, Alameda County, California*. Basin Research Associates, San Leandro, California.

[48] Banks, Peter, 1984. *An Archaeological Reconnaissance of Nine Parcels along Courtland Creek, Line G, in Oakland, Alameda County, California*. California Archaeological Consultants, Inc., Oakland, California.

[49] Banks, Peter, and David A. Fredrickson, 1977. *An Archaeological Investigation of a Portion of Line P, San Leandro Creek, Alameda County, California*. Archaeological Laboratory, California State College, Sonoma. Rohnert Park.

[50] Banks, Peter, and David A. Fredrickson, 1977. *An Archaeological Investigation of Sausal Creek, between East 15th and Logan Streets, Oakland, Alameda County, California*. Archaeological Laboratory, California State College, Sonoma. Rohnert Park.

[51] Young, Bertrand T., and George R. Miller, 1982. *An Archaeological Reconnaissance of Sausal Creek between Leimert and Hyde Streets in the City of Oakland.* Institute of Cultural Resources, California State University, Hayward.

locations proposed for restoration. Studies near Peralta Creek at Peralta Hacienda Historical Park have identified historical archaeological deposits, recorded as CA-ALA-585H.[52]

d. Regulatory Context. The following describes CEQA's and the City's Historic Preservation Element of the General Plan regulatory and policy requirements for cultural resources.

(1) CEQA Requirements. CEQA defines a "historical resource" as a resource which meets one or more of the following criteria: 1) listed in, or determined eligible for listing, in the California Register of Historical Resources (California Register); 2) listed in a local register of historical resources as defined in Public Resources Code (PRC) Section 5020.1(k); 3) identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or 4) determined to be a historical resource by a project's lead agency (Public Resources Code Section 21084.1 and *CEQA Guidelines* Section 15064.5(a)). A historical resource consists of:

> "Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California…. Generally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" *CEQA Guidelines* Section 15064.5(a)(3).

In accordance with *CEQA Guidelines* Section 15064.5(b), a substantial adverse change in the significance of a historical resource is a significant effect on the environment.

CEQA requires a Lead Agency to determine if an archaeological cultural resource meets the definition of a historical resource, a unique archaeological resource, or neither (*CEQA Guidelines* Section 15064.5(c)). Prior to considering potential impacts, the Lead Agency must determine whether an archaeological cultural resource meets the definition of a historical resource in *CEQA Guidelines* Section 15064.5(c)(1). If the archaeological cultural resource meets the definition of a historical resource, then it is treated like any other type of historical resource in accordance with *CEQA Guidelines* Section 15126.4. If the archaeological cultural resource does not meet the definition of a historical resource, then the lead agency determines if it meets the definition of a unique archaeological resource as defined at CEQA Section 21083.2(g). In practice, however, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource.[53] Should the archaeological cultural resource meet the definition of a unique archaeological resource, then it must be treated in accordance with CEQA Section 21083.2. If the archaeological cultural resource does not meet the definition of a historical resource or an archaeological resource, then effects to the resource are not considered significant effects on the environment (*CEQA Guidelines* Section 15064.5(c)(4)).

California Health and Safety Code (HSC) Section 7050.5 states that in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adja-

[52] See Costello and Duval, 2001 for a summary of previous archaeological work done at the Peralta Hacienda Historical Park.

[53] Bass, Ronald E., Albert I. Herson, and Kenneth M. Bogdan, 1999:105. *CEQA Deskbook: A Step-by-Step Guide on how to Comply with the California Environmental Quality Act*. Solano Press Books, Point Arena, California.

cent remains until the coroner of the county in which the remains are discovered has determined whether or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Public Resources Code (PRC) Section 5097.5 provides for the protection of cultural and paleontological resources. This PRC section prohibits the removal, destruction, injury, or defacement of archaeological and paleontological features on any lands under the jurisdiction of State or local authorities.

(2) Historic Preservation Element. The Historic Preservation Element (HPE) of the Oakland General Plan presents goals, policies, and objectives that guide historic preservation efforts in Oakland. HPE policies define the criteria for legal significance that must be met by a resource before it is listed in Oakland's local register of historical resources, and would, therefore, be considered a historical resource under CEQA. Based on a city-wide preliminary architectural inventory completed by the OCHS, pre-1945 properties have been assigned a significance rating of A, B, C, D, or E and assigned a number (1, 2, or 3) which indicates its district status. The ranking system indicates a property's status as a historical resource and identifies those properties warranting special consideration in the planning process and is described in Table IV.G-2.

The HPE also establishes the following policy with respect to historical resources under CEQA:

- Policy 3.8: For the purposes of environmental review under CEQA, the following properties will constitute the City of Oakland's Local Register:
  - All "Designated Historic Properties," i.e., those properties that are City Landmarks, which contribute to or potentially contribute to Preservation Districts, and Heritage Properties;
  - Those "Potential Designated Historic Properties" that have an existing rating of "A" or "B" or are located within an "Area of Primary Importance;"
  - Until complete implementation of Action 2.1.2 (Redesignation), the "Local Register" will also include the following designated properties: Oakland Landmarks, S-7 Preservation Combining Zone properties, and Preservation Study List properties.

The HPE includes other policies that seek to encourage the preservation of Oakland's significant historic resources within the context of balanced development and growth. These policies are presented below.

- Policy 3.1: Avoid or Minimize Adverse Historic Preservation Impacts Related to Discretionary City Actions. The City will make all reasonable efforts to avoid or minimize adverse effects on the Character-Defining Elements of existing or Potential Designated Historic Properties which could result from private or public projects requiring discretionary actions.
- Policy 3.4: City Acquisition of Historic Preservation Where Necessary. Where all other means of preservation have been exhausted, the City will consider acquiring, by eminent domain if necessary, existing or Potential Designated Historic Properties, or portions thereof, in order to preserve them. Such acquisition may be in fee, as conservation easements, or a combination thereof.
- Policy 3.5: Historic Preservation and Discretionary Permit Approvals. For any project involving the complete demolition of Heritage Properties or Potential Designated Historic Properties requiring discretionary City permits, the City will make a finding that: 1) the design quality of the proposed project is at least equal to that of the original

Table IV.G-2 Oakland Cultural Heritage Survey Significance Ratings

Rating Level	Description
A: Properties of Highest Importance	This designation applies to the most outstanding properties, considered clearly eligible for individual National Register and City Landmark designation. Such properties consist of outstanding examples of an important style, type, or convention, or intimately associated with a person, organization, event, or historical pattern of extreme importance at the local level or of major importance at the state or national level.
B: Properties of Major Importance	These are properties of major historical or architectural value but not sufficiently important to be rated "A." Most are considered individually eligible for the National Register, but some may be marginal candidates. All are considered eligible for City Landmark designation and consist of especially fine examples of an important type, style, or convention, or intimately associates with a person, organization, event, or historical pattern of major importance at the local level or of moderate importance at the state or national level.
C: Properties of Secondary Importance	These are properties that have sufficient visual/architectural or historical value to warrant recognition but do not appear individually eligible for the National Register. Some may be eligible as City Landmarks and are superior or visually important examples of a particular type, style, or convention, and include most pre-1906 properties
D: Properties of Minor Importance	These are properties which are not individually distinctive but are typical or representative examples of an important type, style, convention, or historical pattern. The great majority of pre-1946 properties are in this category.
E, F, or *: Properties of No Particular Interest.	Properties that are less than 45 years old or modernized.
District Status	**Description**
1	A property in an Area of Primary Importance (API) or National Register quality district. An API is a historically or visually cohesive area or property group identified by the OCHS which usually contains a high proportion of individual properties with ratings of "C" or higher.
2	A property in an Area of Secondary Importance (ASI) or a district of local significance. An ASI is similar to an API except that an ASI does not appear eligible for the National Register.
3	A property not within a historic district.

Note: Properties with ratings of "C" or higher or are contributors to or potential contributors to an API or ASI are considered Potential Designated Historic Properties (PDHP) that may warrant consideration for preservation by the City.

structure and is compatible with the character of the neighborhood; or 2) the public benefits of the proposed project outweigh the benefit of retaining the original structure; or 3) the existing design is undistinguished and does not warrant retention and the proposed design is compatible with the character of the neighborhood.

- Policy 3.7: Property Relocation Rather than Demolition. As a condition of approval for all discretionary projects involving demolition of existing or Potential Designated Historic Properties, the City will normally require that reasonable efforts be made to relocate the properties to an acceptable site.

Although the HPE focuses primarily on built environment resources, prehistoric and historical archaeological resources are considered under the following policy:

- Policy 4.1: Archaeological Resources. To protect significant archaeological resources, the City will take special measures for discretionary projects involving ground disturbances located in archaeologically sensitive areas. This policy entails that mitigation measures are typically incorporated into the project as part of the environmental review

process, which can include a surface reconnaissance by an archaeologist to identify archaeological deposits; monitoring of ground disturbance during construction to identify archaeological resources and stopping work if necessary to provide recommendations for the treatment of uncovered archaeological materials; and performing limited pre-construction archaeological excavations to determine whether archaeological materials are present.

(3) City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential cultural resource impacts would be reduced.

Condition 40: Archaeological Resources. *Ongoing throughout demolition, grading, and/or construction*. Pursuant to CEQA Guidelines 15064.5 (f), "provisions for historical or unique archaeological resources accidentally discovered during construction" should be instituted. Therefore, in the event that any prehistoric or historic subsurface cultural resources are discovered during ground disturbing activities, all work within 50 feet of the resources shall be halted and the project applicant and/or lead agency shall consult with a qualified archaeologist or paleontologist to assess the significance of the find. If any find is determined to be significant, representatives of the project proponent and/or lead agency and the qualified archaeologist would meet to determine the appropriate avoidance measures or other appropriate mitigation, with the ultimate determination to be made by the City of Oakland. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and a report prepared by the qualified archaeologist according to current professional standards.

In considering any suggested measure proposed by the consulting archaeologist in order to mitigate impacts to historical resources or unique archaeological resources, the project applicant shall determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery) shall be instituted. Work may proceed on other parts of the project site while mitigation for historical resources or unique archaeological resources is carried out.

Should an archaeological artifact or feature be discovered on-site during project construction, all activities within a 50-foot radius of the find would be halted until the findings can be fully investigated by a qualified archaeologist to evaluate the find and assess the significance of the find according to the CEQA definition of a historical or unique archaeological resource. If the deposit is determined to be significant, the project applicant and the qualified archaeologist shall meet to determine the appropriate avoidance measures or other appropriate measure, subject to approval by the City of Oakland, which shall assure implementation of appropriate measure(s) recommended by the archaeologist. Should archaeologically-significant materials be recovered, the qualified archaeologist would recommend appropriate analysis and treatment, and would prepare a report on the findings for submittal to the Northwest Information Center.

Condition 41: Human Remains. *Ongoing throughout demolition, grading, and/or construction.* In the event that human skeletal remains are uncovered at the project site during construction or ground-breaking activities, all work shall immediately halt and the Alameda County Coroner shall be contacted to evaluate the remains, and following the procedures and protocols pursuant to Section 15064.5 (e)(1) of the CEQA Guidelines. If the County Coroner determines that the remains are Native American, the City shall contact the California Native American Heritage Commission (NAHC), pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, and all excavation and site preparation activities shall cease within a 50-foot radius of the find until appropriate arrangements are made. If the agencies determine that avoidance is not feasible, then an alternative plan shall be prepared with specific steps and timeframe required to resume construction activities. Monitoring, data recovery, determination of significance and avoidance measures (if applicable) shall be completed expeditiously.

Condition 42: Paleontological Resources. *Ongoing throughout demolition, grading, and/or construction.* In the event of an unanticipated discovery of a paleontological resource during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until the discovery is examined by a qualified paleontologist (per Society of Vertebrate Paleontology standards (SVP 1995,1996)). The qualified paleontologist shall document the discovery as needed, evaluate the potential resource, and assess the significance of the find under the criteria set forth in Section 15064.5 of the CEQA Guidelines. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If the City determines that avoidance is not feasible, the paleontologist shall prepare an excavation plan for mitigating the effect of the project on

the qualities that make the resource important, and such plan shall be implemented. The plan shall be submitted to the City for review and approval.

Condition 45: Vibrations Adjacent Historic Structures. *Prior to issuance of a demolition, grading or building permit.* The project applicant shall retain a structural engineer or other appropriate professional to determine threshold levels of vibration and cracking that could damage historic buildings or structures (such as East 18th Street Pier—a component of the Lake Merritt District) and design means and methods of construction that shall be utilized to not exceed the thresholds.

2. Impacts and Mitigation Measures

This section discusses potential impacts to cultural resources that could result from implementation of the Measure DD Project. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents project impacts and identifies mitigation measures as appropriate.

a. Criteria of Significance. Implementation of the Measure DD project components would have a significant impact on cultural resources if they would:

1) Cause a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5. Specifically, substantial adverse changes include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be "materially impaired." The significance of a historical resource is "materially impaired" when a project demolishes or materially alters, in an adverse manner, those physical characteristics of the resource that convey its historical significance and that justify its inclusion on, or eligibility for inclusion on a historical resource list (including the California Register of Historical Resources, the National Register of Historic Places, Local Register, or historical resources survey form (DPR Form 523) with a rating of 1-5);
2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5;
3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature or;
4) Disturb any human remains, including those interred outside of formal cemeteries.

The level of impact to cultural resources is discussed in the following section and summarized in Table IV.G-2.

b. Impacts and Mitigation Measures Applicable to all Project Components. The following describes potential significant impacts to cultural resources that may occur in all four project groups by implementing Measure DD. These impacts are defined below for each of the criterion of significance outlined above.

(1) Substantial Adverse Change in the Significance of a Historical Resource. Historical resources, which include archaeological sites, buildings, and structures, are present in all project groups (see Table IV.G-1). The differing types of resources present in each project group preclude a single mitigation that would adequately address all possible project effects (i.e., mitigation of project impacts to an archaeological site would not necessarily be applicable to a historical building).

Table IV.G-3: Summary of Potential Impacts – Cultural Resources

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Cause a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5.?	⊙ CULT-1	○	○	⊙ CULT-2
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	○	○	○	○
3. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	○	○	○	○
4. Disturb any human remains, including those interred outside of formal cemeteries?	○	○	○	○

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
○ Less-than-Significant or Less-than-Significant with standard Conditions of Approval
⊙ Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable

CULT-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

Potential impacts to historical resources are discussed below in Section IV.G.2.c according to individual project components.

(2) Substantial Adverse Change in the Significance of an Archaeological Resource. Archaeological sites are reported in the Lake Merritt group (CA-ALA-5, P-01-010693, and P-01-010694) and City-wide Creeks group (CA-ALA-585H). No archaeological sites were identified for the Waterfront Trail and Recreational Facilities groups. Implementation of the City's Standard Conditions of Approval (Condition 40: Archaeological Resources) would ensure that, should an archaeological site be accidentally discovered as a result of project implementation, impacts to the resource would be reduced to a less-than-significant level. Potential impacts to archaeological resources in the Lake Merritt and City-wide Creeks groups are discussed below in Section IV.G-2c according to individual project components.

(3) Destroy a Unique Paleontological Resource. The geologic units that underlie project area soils and fill may contain significant, non-renewable paleontological resources. Implementation of the City's Standard Conditions of Approval (Condition 42: Paleontological Resources) would

ensure that, should significant paleontological resources be accidentally discovered as a result of project implementation, impacts to such resources would be reduced to a less-than-significant level.

(4) Disturb Human Remains. This study did not identify human remains in any of the component groups, although the presence of such remains cannot be ruled out. Native American skeletal and cremated remains are often interred in shellmounds and at sites used for habitation. A shellmound (CA-ALA-5) was recorded around 1910 by Nels Nelson and Arnold Pilling in the Lake Merritt group. Several of the proposed City-wide Creeks restoration and acquisition properties were conducive to prehistoric occupation given the presence of a reliable water source and important riparian resources. Implementation of the City's Standard Conditions of Approval (Condition 41: Human Remains) would ensure that, should human remains be accidentally discovered as a result of project implementation, impacts would be reduced to a less-than-significant level. Potential impacts to prehistoric resources in the Lake Merritt and City-wide Creeks groups are discussed below in Section IV.G.2.c according to individual project components.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential impacts to cultural resources that are unique to individual project components. Potential impacts are associated with one of the three significance criteria described in Section IV.G.2.a.

(1) Substantial Adverse Change in the Significance of a Historical Resource. Potential site-specific impacts to historical resources are discussed below.

There are two structures, the Livingston Pier and the Cryer Boatworks, within the Waterfront Trail group and one building, Brookfield Elementary School, within the Recreational Facilities group that have been assigned ratings of "C" by the OCHS. According to HPE Policy 3.8, only buildings with a rating of "A" or "B" or those buildings located within an "Area of Primary Importance" would be considered properties on the City of Oakland's Local Register. The Livingston Pier is categorized as a C3 structure by the OCHS and may contribute to the Embarcadero Cove District, a "future Area of Secondary Importance." The "Cryer & Son Boat Builder" building at 1899 Dennison Street, an early 1900s building, and the Brookfield Elementary School, which was constructed ca. 1951, have been categorized as C3 structures by the OCHS. Thus, projects effects on these buildings (either demolition or modification) would be less than significant because they are not considered significant under the City's CEQA guidelines.

<u>Impact CULT-1 (Group 1)</u>: Project activities within the Lake Merritt and Lake Merritt Channel group may impact subsurface prehistoric archaeological materials that may qualify as historical resources under CEQA. (S)

CA-ALA-5, a prehistoric shellmound recorded around 1910, may be within the Lake Merritt area. The location of CA-ALA-5 is uncertain. Nelson and Pilling described CA-ALA-5 as being "on SW side of Lake Merritt, near outlet." As currently mapped at the NWIC, however, CA-ALA-5 is plotted on the southeast side of Lake Merritt near Lakeshore Avenue and outside of the 12th Street reconstruction area where the most substantial ground disturbing activities are proposed. In December 2004 Suzanne Baker and Michael Smith of Archaeological/Historical Consultants visited the mapped location of CA-ALA-5 and did not identify surface evidence of an archaeological site. Baker and Smith did note, however, the possibility of a subsurface deposit. Baker and Smith also identified P-

01-010694, a possible prehistoric site which consisted of "shell and dark sand" but no artifactual materials, in the 12th Street reconstruction area approximately 200 meters from the mapped location of CA-ALA-5. P-01-010694 is recorded in a road median in a "highly disturbed" area and is unlikely to qualify as a historical resource. In fact, Baker believed the P-01-010694 is likely to be imported fill and not an archaeological deposit.[54] Nonetheless, Baker believes that the areas of CA-ALA-5 and P-01-010694 are of high archaeological sensitivity, and the possibility exists for significant subsurface archaeological materials in the 12th Street reconstruction area.

While there is inadequate information available to determine whether CA-ALA-5 or P-01-010694 would be archaeological resources pursuant to *CEQA Guidelines* Section 15064.5 or unique archaeological resources pursuant to Section 21083.2, they may nevertheless be historical resources. Implementation of Mitigation Measure CULT-1 would ensure that impacts to archaeological sites in the 12th Street reconstruction area would be reduced to a less-than-significant level.

> Mitigation Measure CULT-1 (Group 1): A qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards CFR 66, Appendix C, (48 FR 44738-9) and the certification requirements of the Register of Professional Archaeologists shall monitor initial project construction ground disturbing activities, such as trenching or excavating with a backhoe or bulldozer, in the 12th Street reconstruction area. The protocols for monitoring and data recovery outlined in the *Archaeological Monitoring and Discovery Plan, 12th Street Reconstruction Project* (AMDP)[55] shall be implemented. Monitoring shall continue as deemed necessary by the monitor based on the initial observations. If the monitor observes subsurface prehistoric archaeological materials during excavation, such as those associated with CA-ALA-5 or P-01-010694, the monitor shall ensure that appropriate actions are taken as described in the following paragraphs.
>
> In the event that archaeological materials are identified (e.g., obsidian, heat-affected rock, faunal bone, and midden), the archaeologist will immediately notify the Construction Manager, who will temporarily stop construction to permit an examination of the find. Should the monitoring archaeologist determine that the cultural object or feature is significant (i.e., appears eligible for listing in the California Register of Historical Resources), a determination will be made as to the areal extent of the find, and the time required to mitigate (i.e., record and remove or collect all or part of) the discovery. Once the archaeological monitor has made a determination as to the time required to mitigate the find, and has sufficient supporting information, the monitor will take the following steps: 1) record, but not remove materials if non-cultural or non-significant, and allow work to progress, or 2) record and remove the isolated or limited cultural materials and permit work to progress.
>
> If the above steps do not apply (i.e., in those instances where the cultural materials are significant and not isolated or spatially limited), then the Construction Manager shall be notified and recovery of the materials shall occur. Diagnostic artifacts, as well as those classes of artifacts for which an adequate sample has not yet been recovered, shall be collected and

[54] Baker, Suzanne, 2005. *Positive Archaeological Survey Report for the Alameda-Contra Costa Transit District's East Bay Rapid Transit Project in Berkeley, Oakland, and San Leandro*. Archaeological/Historical Consultants, Oakland, California.

[55] William Self Associates, Inc., 2005:4-9. *Archaeological Monitoring and Discovery Plan, 12th Street Reconstruction Project*. William Self Associates, Inc., Orinda, California.

bagged following photographing and recording of provenience. Mapping of deposits would be coordinated using existing engineering survey controls, and elevation accuracy will be maintained during the excavation to permit provenience controls for artifact recording. All information needed, including soil color or type, elevation, location, photographs, and sketch maps will be gathered as quickly as conditions permit to allow resumption of construction activities. All recovered cultural materials shall be cleaned as appropriate, preserved if necessary, bagged, and tagged or marked so as to permit its identification in an acceptable record system, and in accordance with recognized professional standards. All recovered cultural material shall be analyzed sufficiently to permit identification in accordance with recognized professional standards and submitted to a curation facility, as appropriate. A Final Monitoring Report shall be prepared, describing the results of monitoring, data recovery, and analysis. (LTS)

Impact CULT-2 (Group 4): Project activities associated with the City-wide Creeks group may impact historical resources. (S)

This EIR has identified historical resources within or near creeks proposed for restoration that are City Landmarks and appear eligible to the California Register. These consist of the Rancho San Antonio Headquarters, which includes buildings and archaeological deposits associated with the Peralta family, adjacent to Peralta Creek; the ca. 1860s J. Mora Moss House in Mosswood Park adjacent to Glen Echo Creek; and Oak Glen Park along Richmond Boulevard, including its bridge, pergola, paths, native riparian vegetation, and buildings along Richmond Boulevard. Several of the City-wide Creeks project component areas appear sensitive for prehistoric archaeological materials since these areas, with a reliable water source and important riparian resources, would have been suitable for occupation. At the time of preparing this EIR, descriptions for each of the City-wide Creeks components are unavailable and, therefore, require that these components be addressed at a program level. Implementation of Mitigation Measure CULT-2 will ensure that if cultural resources are identified within City-wide Creeks groups that impacts to these resources would be reduced to a less-than-significant level.

Mitigation Measure CULT-2 (Group 4): A preconstruction cultural resources study by a qualified person shall be done for the City-wide Creeks project sites, unless the proposed activities at the site would involve minimal (or no) ground disturbance, such as weeding, hand planting, sign placement, or pruning. For this non-intrusive or minimally intrusive work no mitigation would be needed. For all other work, the preconstruction study will be used to determine whether cultural resource(s) will be adversely affected by project activities and will ensure that, if a cultural resource(s) is present within a City-wide Creek restoration site, impacts to this resource will be avoided or mitigated.

The first phase of the study will assess the prehistoric and historical sensitivity for each City-wide Creeks restoration site (or group of sites) and will review project plans to assess the potential for project activities to impact cultural resources at a creek restoration site. The study will include a literature review and a records search at the Northwest Information Center, Rohnert Park, and a site visit to determine the likelihood of recorded or surface-exposed cultural resources at a creek restoration site. A brief letter report shall be prepared for the City that includes the results of the background research and, based on the results of the background research, a determination of whether additional study for cultural resources at a given location

will be necessary. If no cultural resources that would be disturbed by the project activities are identified in this phase, the City's Standard Conditions of Approval, which address accidental discoveries, shall be implemented and would reduce the impact to a less-than-significant level. If cultural resources that could be disturbed by the project activities are tentatively identified, additional study, construction monitoring, and mitigation, as appropriate, shall be performed.

If cultural resources that could be disturbed by the project activities are tentatively identified, a field survey shall be conducted to identify the cultural resources and an archaeological excavation shall be performed, as necessary, to determine whether archaeological deposits are present. The excavation phase may be conducted during the initial ground disturbing work at the site(s). If the excavation phase is conducted during the initial ground disturbing work, the monitoring protocols described in CULT-1 shall be followed. If no cultural resources are identified in this phase, the City's Standard Conditions of Approval, which address accidental discoveries, shall be implemented and would reduce the impact to a less-than-significant level. If cultural resources are identified, the cultural resources shall be preserved, mapped and otherwise documented as described in CULT-1. Implementation of these measures will reduce the impact to a less-than-significant level. (LTS)

(2) Substantial Adverse Change in the Significance of an Archaeological Resource. No impacts were identified unique to select project components to archaeological resources pursuant to *CEQA Guidelines* Section 15064.5 or unique archaeological resources pursuant to Section 21083.2. Nevertheless, implementation of CULT-1 and CULT-2 and the City's Standard Conditions of Approval (Condition 40) will ensure that, should an archaeological resource be identified during project implementation, impacts to such resources will be reduced to a less-than-significant level.

(3) Disturb Human Remains. No impacts were identified unique to select project components for human remains. The City's Standard Conditions of Approval (Condition 41) will ensure that, should human remains be identified during project implementation, impacts to such resources will be reduced to a less-than-significant level.

H. HYDROLOGY AND WATER QUALITY

This section describes the existing hydrological setting for the Measure DD Implementation Project, including runoff, drainage, and water quality, and identifies significant environmental impacts to hydrology and water quality that may result from project implementation. Mitigation measures for the identified significant impacts are provided, as appropriate.

The Measure DD Implementation Project includes components designed to improve the water quality of Lake Merritt, the Lake Merritt Channel, and by extension the Oakland Estuary and San Francisco Bay. The City-wide Creeks components of Measure DD propose stream protection and restoration projects intended to improve water quality and reduce flooding hazards for select creeks and watersheds within the City of Oakland.

1. Setting

This section describes the existing conditions at or near the component sites related to hydrology, water quality and storm drainage. This subsection discusses the methods used for analyzing the existing conditions for each of the four groups of project components. Additionally, the regulatory framework related to hydrology affecting the component sites is described. This section is based on material included with the component applications, review of published and unpublished regional and local area hydrologic reports and maps, environmental investigation reports, available site-specific technical reports, and a site reconnaissance.

a. Overview. This section provides an overview of climate, runoff and drainage, flooding, water quality, and ground wells.

(1) Climate. The climate of the Bay Area is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warm dry summers. The mean annual rainfall in the City of Oakland for the period between 1970 and 2006 is approximately 23.5 inches, with the vast majority of rainfall between October and May. Rainfall varies somewhat west to east across Oakland; the mean annual rainfall near the San Francisco Bay is approximately 18.0 inches and in the upper Oakland Hills it is approximately 25.0 inches.[1] Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region. Severe, damaging rainstorms occur in the Bay Area at a frequency of about once every three years.[2]

(2) Runoff and Drainage. In an undeveloped setting, when rainfall intensities exceed the infiltration capacity of surface soils, runoff flows over the ground surfaces toward established natural drainage channels. Stormwater runoff is then conveyed away from the area in creeks and streams. In a developed setting, an increased portion of the natural soils is covered with impervious surfaces (i.e. roads, driveways, and roofs), increasing amounts and altering flow patterns of runoff. In developed portions of the City, storm drainage is conveyed in underground pipes, channels, and, to a lesser extent, swales. Specific drainage patterns at each component groups are discussed below.

[1] Western Regional Climate Center, 2007, *Historical Climate Information*, accessed 2-12-07 at www.wrcc.dri.edu.

[2] Brown, William M. III, 1988. *Historical Setting of the Storm: Perspectives on Population, Development, and Damaging Rainstorms in the San Francisco Bay Region*, in Landslides, Floods, and Marine Effects of the Storm of January 3-5, 1982, in the San Francisco Bay Region, California, Stephen D. Ellen and Gerald F. Wieczorek, Eds., U.S. Geological Survey Professional Paper 1434.

(3) Flooding. In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The Federal Emergency Management Agency (FEMA) manages the NFIP. FEMA is the agency responsible for conducting floodplain studies and publishing Flood Insurance Rate Maps (FIRMs) that delineate flood hazard areas. The City of Oakland is a participating community in the NFIP, and therefore all new development must comply with the minimum requirements of the NFIP.[3] Specific storm-related flooding hazards within each component group are discussed below.

Flooding can also occur as a result of catastrophic dam failure and the release of waters contained in upstream reservoirs. The component sites could be inundated if one or more of the several dams in the vicinity were to fail catastrophically. The dam and dam inundation areas that could affect each of the project groups are summarized in Table IV.H-1.

Some of the component sites are located on lowlands near San Francisco Bay, creating the potential for coastal flooding hazards, including tsunami, extreme high tides, and sea level rise. Tsunamis are long period water waves caused by underwater seismic events, volcanic eruptions, or undersea landslides. Tsunamis affecting the San Francisco Bay region would most likely originate west of the Bay, in the Pacific Ocean. Areas that are highly susceptible to tsunami inundation tend to be located in low-lying coastal areas such as tidal flats, marshlands, and former bay margins that have been artificially filled.

Extreme high tides in San Francisco Bay result from the combined effects of astronomical high tides (related to the lunar cycle) and other factors including winds, barometric pressure, ocean temperatures, and freshwater runoff. In California, the highest astronomical tides occur in the summer and winter, and therefore extreme high tides are most likely to occur during these times. Areas susceptible to extreme high tides tend to be located in low-lying coastal areas.

Over the last 100 years, the temperature of the earth's surface has risen approximately 0.6 degree Celsius (1.8 degree Fahrenheit).[4] Global warming causes thermal expansion of the upper layers of the ocean, which increases the volume of water, as well as melting of the earth's glaciers and polar ice fields. Tidal gauge measurements collected over the last 100 years indicate that sea level is rising relative to the land surface in many locations throughout the world. It is a near certainty that sea level will continue to rise in response to global warming. Such increases in sea level, if sustained over long periods of time, could create or exacerbate existing coastal flooding hazards. The group of sites most susceptible to the coastal flooding hazards is the Oakland Waterfront Trail sites.

(4) Water Quality. The quality of surface water and groundwater in the vicinity of the project sites are affected by past and current land uses at the individual sites and within the watershed, and the composition of geologic materials in the vicinity. Water quality in surface and groundwater bodies is regulated by the State Water Resources Control Board and Regional Water Quality Control

[3] City of Oakland, 2004. *General Plan, Chapter 6, Safety Element.* November.

[4] Intergovernmental Panel on Climate Change, 2001, Climate Change 2001: Synthesis Report, Summary for Policymakers.

Table IV.H-1: Dam and Reservoirs in the Vicinity of the Component Area

Affected site	Dam	Reservoir Name	Capacity (acre-feet)	Drainage (sq. miles)	Jurisdiction	Owner
East Oakland Aquatic, Sports and Recreation Complex	Chabot	Lake Chabot	10,281	41.4	State of California	EBMUD
	New Upper San Leandro	Upper San Leandro Reservoir	42,000	29.95	State of California	EBMUD
Lake Merritt and Lake Merritt Channel	Estates	Reservoir No. 1	56	0.01	State of California	EBMUD
	Piedmont	Reservoir No. 2	60	0.0 (Off-stream Reservoir)	State of California	EBMUD
Studio One	Lake Temescal	Lake Temescal	485	3.0	State of California	EBRPD
Waterfront Trails (Tidal Canal area)	Central	Central Reservoir	485	0.0 (Off-stream Reservoir)	State of California	EBMUD

Source: Governors Office of Emergency Services (OES), 2006, *GIS: Dam Inundation Maps*, State of California, 30 March.
EBMUD = East Bay Municipal Utilities District
EBRPD = East Bay Regional Park District

Boards. The component sites are under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (Water Board). Specific water quality issues at each of the component subareas are discussed below. The potential for the presence of contamination in the underlying groundwater associated with historic industrial activity at the Measure DD sites is discussed in the Hazards section of this DEIR.

(5) Groundwater Wells. Prior to establishment of modern infrastructure, the City of Oakland and vicinity historically relied on groundwater wells for most of the water supply. Many of these wells were properly abandoned (i.e. removed or sealed). However, many undocumented and non-maintained wells still exist in the East Bay area.[5] It is possible that undocumented wells are present at one or more of the project component sites. If damaged or not properly sealed, these remaining wells may act as a conduit for contaminant migration from the surface to the underlying aquifer.

b. Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt is a 140-acre tidal estuary formed in a drowned valley and joined to the Oakland Estuary and San Francisco Bay by the Lake Merritt Channel. The Lake has an average depth of seven to eight feet, 3.4 miles of shoreline, is classified as a Wildlife Refuge, and drains a watershed of approximately 4,650 acres.[6, 7]

(1) Runoff and Drainage. The topography of the project area adjacent Lake Merritt is flat to gently rolling, ranging in elevation from approximately sea level to 25 feet above mean sea level

[5] Figuers, S., 1998, *Groundwater Study and Water Supply History of the East Bay Plain, Alameda, and Contra Costa Counties*, June 15.

[6] California's Critical Coastal Area, 2006, *State of the CCAs Report, June 15*, accessed 2-13-07 at www.coastal.ca.gov.

[7] Carter, G., et al., 2005, *Water Quality Investigations at Lake Merritt in Oakland, California*, American Geophysical Union.

(msl) relative to the National Geodetic Vertical Datum (NGVD).[8, 9] Based on mapping of regional historic drainage conditions, some components, particularly those to the north and northeast of the Lake, are beyond the historical shorelines of Lake Merritt,[10] while other components are within the historical boundaries of the Lake and located on artificial fill over Bay Mud.[11] Currently around Lake Merritt, impervious surfaces such as roadways, parking areas, and paved walkways cover a significant portion of the site. Runoff from sidewalks, pathways, driveways and parking areas is directed by sheetflow towards lawns and landscaped areas. In other places, primarily roadways, street-side gutters and stormwater conveyance systems collect stormwater and direct it into Lake Merritt or the Lake Merritt Channel through approximately 60 stormdrain outfalls. Stormwater runoff in much of the 12th Street component area is directed toward a drainage system that consists of a network of drainage inlets, pipe culverts, and pump houses, and discharges into Lake Merritt or the Lake Merritt Channel.[12]

In the vicinity of the Lake, groundwater occurs at a depth of approximately five to ten feet below the ground surface (bgs).[13] Near Lake Merritt and the Channel, the groundwater level is influenced by the Lake and sea level and may fluctuate with the tides.

(2) Flooding. Based on FEMA mapping, the component sites adjacent the shorelines of Lake Merritt and the Lake Merritt Channel are located at least partially in the 100-year flood hazard zone,[14,15] and therefore could be affected by flooding. These component sites could be impacted if the Estates or Piedmont dams were to fail catastrophically. The location of the components on lowlands near San Francisco Bay creates a potential for coastal flooding hazards, including tsunami, extreme high tides, and sea level rise.

Preliminary site-specific studies for the 12th Street Bridge project have been completed to characterize the hydrology, tidal behavior, and potential wave run-up hazards associated with the 25- and 100-year storms for Lake Merritt and the Channel. The predicted Lake Merritt surface elevation under existing conditions with all pumps running to relieve high water conditions would be 7.9 feet above msl for a 25-year event, and 8.9 feet above msl for the 100-year storm event.[16]

[8] Note: City of Oakland Vertical Datum (COO) is equal to NGVD29 minus 3.0 feet, and NAVD88 minus 5.7 feet.

[9] United States Geological Survey (USGS), 1959 photo revised in 1980, Oakland West Topographic Quadrangle.

[10] Sowers, Janet M., 1993 (revised 1995 & 2000). *Creek and Watershed Map of Berkeley & Oakland,* Oakland Museum.

[11] USDA, Soil Conservation Service, 1981, *Soil Survey of Alameda County, California, Western Part,* March.

[12] Rajappan & Meyer Consulting Engineers, Inc., 2005, 12th Street Reconstruction Project: Draft Drainage Report, February.

[13] Geo/Resources Consultants, Inc., 2006, Geotechnical Investigation 12th Street Reconstruction Project, Oakland, California, April, Report No. 2046-100

[14] Federal Emergency Management Agency (FEMA), 1982, Flood Insurance Rate Map No. 065048 0015 B Oakland, City - Alameda County, 30 September.

[15] FEMA, 1982, Flood Insurance Rate Map No. 065048 0020 B Oakland, City - Alameda County, 30 September.

[16] Phillip Williams & Associates (PWA), 2004, Memorandum: Lake Merritt Design Flood Levels, 25 August, PWA#1726

(3) Water Quality. Stormwater from the Lake Merritt group of component sites discharges directly into Lake Merritt, a water body that is listed as impaired by the Water Board for organic enrichment/low dissolved oxygen as well as trash.[17] Approximately 60 stormdrain outfalls and several creeks flow into Lake Merritt. The ability of Lake Merritt and the Lake Merritt Channel to be flushed by natural tidal action has been limited by the encroachment of artificial fill and structures placed in the Lake Merritt Channel.[18]

c. Waterfront Trail (Group 2). The Oakland Waterfront Trail is part of the San Francisco Bay Trail. Projects within this group may include grading, demolition, refurbishment or replacement of structures as well as trail construction and restoration of disturbed coastal areas to tidal wetlands. The trail and park component sites are located along the eastern shore of the Oakland Estuary. Existing hydrologic conditions of the Waterfront Trail components are described below.

(1) Runoff and Drainage. The Oakland Waterfront Trail components are located adjacent to the Oakland Estuary in an area that is relatively flat, ranging in elevation from approximately sea level to eight feet above msl.[19] Based on mapping of regional historic drainage conditions, some components, particularly west of 29th Street along Brooklyn Basin, are in reclaimed areas consisting of artificial fill over Bay Mud, or former tidal wetlands.[20,21] Currently, the proposed trail route consists of existing trail segments, open land, and commercial properties. Impervious surfaces such as roadways, parking areas, and paved walkways, cover portions of various components; however, much of the proposed trail is pervious surface (i.e. unpaved). In some places current runoff is directed by sheetflow towards open lots or landscaped areas. In other places, storm water flows directly towards the estuary or into conveyance systems and then to the estuary. Because of the proximity of the estuary, groundwater levels may be influenced by sea level.

(2) Flooding. Based on FEMA mapping, most components sites adjacent to the shoreline of the Oakland Estuary are at least partially in the 100-year flood zone. [22,23] The components between 29th and High Streets could be impacted by inundation if the Central Dam were to fail catastrophically (Table IV.H-1). The location of the components, on lowlands near San Francisco Bay, creates a potential for the sites to be affected by coastal flooding hazards, including tsunami, extreme high tides, and sea level rise.

(3) Water Quality. Stormwater from the Oakland Waterfront Trail components discharges directly into the Oakland Inner Harbor Channel, a water body that is listed as impaired by the Water Board. The Water Board has designated the Oakland Inner Harbor Channel as water quality impaired

[17] Water Board, San Francisco Bay Region, 2003. 2002 CWA Section 303(d) List of Water Quality Limited Segment, Approved by USEPA, July 2003.

[18] California's Critical Coastal Area, 2006, op. cit.

[19] USGS, 1980, op. cit.

[20] Sowers, Janet M., 1993 (revised 1995 & 2000), op. cit.

[21] USDA, Soil Conservation Service, 1981, op. cit.

[22] FEMA, 1982, op. cit.

[23] FEMA, 1982, Firm # 065048 0025 B Oakland, City - Alameda County, 30 September.

for chlordane, DDT, diazinon, dieldrin, dioxin compounds, furan compounds, mercury, PCBs, selenium and exotic species.[24]

d. Recreational Facilities (Group 3). The two components within this group are the renovation of the historic Studio One Art Center, located in North Oakland and the construction of an East Oakland Aquatic, Sports and Recreation Complex. Existing hydrologic conditions of and around these facilities are described below.

(1) Studio One Art Center. The art center building is in the process of being refurbished, including seismic retrofitting with completion of improvements anticipated in 2007.

Runoff and Drainage. This component is located in an area with a gently rolling topography at an elevation of about 110 feet above msl.[25] No open creek or stream channels cross the project site; however, based on mapping of regional historic drainage conditions, a creek did cross the site, running north to south aligned approximately with the east end of the adjacent football field. Currently, impervious surfaces such as parking areas and paved walkways cover most of site. Runoff from sidewalks, play areas, driveways and parking areas in the form of sheetflow is directed towards landscaped areas or in curb-side gutters to storm water conveyance systems under 45th Street, and then to San Francisco Bay through the municipal stormwater system.[26]

Flooding. Based on FEMA mapping, Studio One is not located in a 100-year flood hazard zone.[27] The area could be impacted if Lake Temescal Dam were to fail catastrophically (Table IV.H-1). This component site; at an elevation of approximately 100 feet msl and more than a mile from San Francisco Bay, is not subject to coastal flooding hazards, including tsunami, extreme high tides, and sea level rise.

Water Quality. No open water bodies are present within the boundaries of this component site.

(2) East Oakland Sports Complex. This component is in the design phase, and would likely include an aquatic center, sports and recreation facilities. Schematic drawings prepared for this component indicate ground water elevations to be four to ten feet.[28,29,30]

Runoff and Drainage. This component site currently has gently rolling topography, rising from an elevation of about approximately 6 feet at the southwest corner to approximately 12 feet at the northeast corner.[31] No historical or current open creek or stream channels cross the project site. A

[24] Water Board, 2003, op. cit.

[25] USGS, 1959 revised 1980, op. cit.

[26] Sowers, Janet M., 1993 (revised 1995 & 2000). *Creek and Watershed Map of Berkeley & Oakland,* Oakland Museum of California.

[27] FEMA, 1982, Firm # 065048 0015 B Oakland, City - Alameda County, 30 September.

[28] Note: City of Oakland Vertical Datum (COO) is equal to NGVD29 minus 3.0 feet, and NGVD88 minus 5.7 feet.

[29] ELS Architecture and Urban Design; Murakami/Nelson, 2003, *Oakland Sports Center at Ira Jinkins Park, 100% Schematic Design*, prepared for: City of Oakland Public Works Agency, 31 January.

[30] Ground water elevations are reported based on City of Oakland datum.

[31] USGS, 1959 revised 1980, op. cit.

stormwater conveyance runs under Jones Street towards the southwest, merging with an engineered channel leading to San Leandro Bay.[32] Currently, impervious surfaces such as parking areas, paved play areas and paved walkways, cover a substantial portion of the site. Runoff from sidewalks, pathways and some drives and parking areas is directed by sheetflow towards landscaped areas.

Flooding. Based on FEMA mapping, this component site is not located in a 100-year flood zone.[33] This component site could be impacted if the Chabot or Upper San Leandro dams were to fail catastrophically (Table IV.H-1). This component site, with elevations of approximately 9 to 15 foot mean seal level is more than one-half mile from San Francisco Bay, is not subject to coastal flooding hazards, including tsunami, extreme high tides, and sea level rise.

Water Quality. No open water bodies are present within the boundaries of this component site.

e. City-wide Creeks (Group 4). The City of Oakland includes fifteen main creeks with over thirty tributaries that comprise over 40 to 50 miles of open creeks channels. The creek component sites are located throughout the City of Oakland.

(1) Runoff and Drainage. The topography of the City of Oakland ranges from the low elevations of the broad slopes of the near-Bay alluvial plains to the steeper upland terrain of the East Bay Hills. The low alluvial plains, starting at the San Francisco Bay and the Oakland Estuary range in elevation from sea level up to approximately 120 to 200 feet msl at the base of the foothills. Continuing east, the gently rolling uplands areas rise into foothills, and then, generally east of the Hayward Fault, into the steeper terrain of the East Bay Hills rising to elevations near the eastern border of the City of Oakland of approximately 1,440 feet msl.[34] The creek components act as drainageways for these hills, and improvement to streambeds, clearing of obstructions, maintenance of the riparian environment, and erosion protections measures comprise the activities proposed by the project for this group.

(2) Flooding. The channels of the component creeks have been mapped by FEMA. The lower reaches of the creeks are located within the 100-year flood hazard zone. Flooding can also occur as a result of catastrophic dam failure and the release of waters contained in upstream reservoirs. Some of the creek components could be impacted if one or more of the several dams in the vicinity were to fail catastrophically. The location of the component sites in the Oakland Hills eliminates the potential for coastal flooding hazards, including tsunami, extreme high tides, and sea level rise.

(3) Water Quality. The City-wide Creeks group includes one water body that is listed as impaired by the Water Board. The Water Board has designated Lower San Leandro Creek as water quality impaired for diazinon.[35]

f. Regulatory Framework. The following describes the regulatory framework for hydrology and water quality.

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[32] Sowers, Janet M., William Lettis & Associates, Inc., 1997, *Creek & Watershed Map of Hayward & San Leandro, Oakland* Museum of California.

[33] FEMA, 1982, Firm # 065048 0025 B Oakland, City - Alameda County, 30 September.

[34] USGS, 1959 revised 1980, op. cit.

[35] RWQCB, 2003, op. cit.

(1) State Water Resources Control Board and Regional Water Quality Control Board. The State Water Resources Control Board and Regional Water Quality Control Boards regulate water quality. The City of Oakland (and therefore all the Measure DD Implementation Project components) is under the jurisdiction of the Water Board, which is responsible for implementation of state and federal water quality protection policies in the Bay Area. The Water Board implements the Water Quality Control Plan (Basin Plan), a regulatory and policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

The National Pollutant Discharge Elimination System (NPDES) program (established through the Clean Water Act) regulates runoff water quality. The NPDES program objective is to control and reduce pollutant discharges to water bodies. The Water Board administers the NPDES program. The Water Board has conveyed responsibility for implementation of stormwater regulations in the vicinity of the project site to the Alameda Countywide Clean Water Program (ACCWP). The ACCWP maintains compliance with the NPDES Permit and promotes stormwater pollution prevention (and is described further below).

Projects disturbing more than one acre of land during construction are required to file a Notice of Intent (NOI) with the Water Board for coverage under the State NPDES General Construction Permit for discharges of stormwater associated with construction activity. Sites less than one acre and not part of a larger project are not required to file the NOI under the General Construction Permit. However, projects less than an acre are still required to prevent erosion and sediment loss and other potential sources of water pollution resulting from construction by incorporating construction controls using Best Management Practices (BMPs).[36] The ACCWP Stormwater Quality Protection Plan requires that all new construction implement Construction Site Field Controls. The Plan also requires that BMPs be designed and implemented to reduce potential impacts to surface water quality during the construction of the project.[37]

(2) Alameda Countywide Clean Water Program. In 1987, 17 local agencies, including Oakland, formed the Alameda Countywide Clean Water Program (ACCWP) and obtained a joint NPDES permit. The NPDES program objective is to control and reduce pollutant discharges to water bodies from stormwater and point-source discharges.

Participating agencies (including the City of Oakland) must comply with the provisions of the countywide permit by ensuring that new development and redevelopment mitigate water quality impacts to stormwater runoff both during construction and operation periods of projects. Recent changes to the permit held by the ACCWP are detailed in Water Board Order R2-2003-0021 (NPDES Permit No. CAS0029831). All projects are required to apply the following stormwater requirements, as applicable: maximize pervious areas, use construction-period best management practices (BMPs), and post-construction stormwater treatment measures to the maximum extent practicable (MEP). Projects that propose to create (or in the process of redevelopment add or replace) more than 10,000 square feet of impervious surfaces are subject to these regulations plus additional requirements as detailed below.

[36] Alameda Countywide Clean Water Program, 2000 (revised 2002). *Developers, Contractors and Builders,* accessed at www.cleanwaterprogram.org on October 31, 2006.

[37] Alameda Countywide Clean Water Program 2003. *Stormwater Quality Management Plan 2001-2008*. February 19. Accessed at http://www.cleanwaterprogram.org on October 31, 2006.

Several of the proposed component projects would be create more than 10,000 square feet of new impervious surface, and therefore would be required to meet all the terms of the permit, including (but not limited to):

- ***Numeric Sizing Criteria for Post Construction Pollutant Removal Treatment Systems.*** Each project covered by the permit must include source controls, design measures, and treatment controls to minimize stormwater pollutant discharges. Treatment controls must be sized to treat a specific amount – about 85 percent – of average annual runoff (in the Bay Area this is equivalent to about the 1-inch storm).
- ***Operation and Maintenance of Treatment Measures.*** Treatment controls often do not work unless adequately maintained. The permit requires an operations and maintenance (O&M) program, which includes: 1) identifying the properties with treatment controls; 2) developing agreements with private entities to maintain the controls; and 3) periodic inspection, maintenance (as needed), and reporting.
- ***Limitation on Increase of Peak Stormwater Runoff Discharge Rates.*** Urbanization creates impervious surfaces that reduces landscape's natural ability to absorb water and release it slowly to creeks. These impervious surfaces increase peak flows in creeks and can cause erosion. This potential impact to creek systems is termed "hydrograph modification" or "hydromodification." Depending on location, some projects must evaluate the potential for this to occur and provide mitigation as necessary.

Hydromodification (Erosion Control). On March 14, 2007, the San Francisco Bay Regional Water Quality Control Board issued Order No. R2-2007-0025 (NPDES Permit No. CAS0029831), an amendment revising Order No. R2-2003-0021. This order adopts the revised hydrograph modification management provisions and includes by reference the ACCWP countywide Hydrograph Modification Management Plan (HMMP) of May 15, 2005.[38] The HMMP standard is intended to ensure that new projects in Alameda County, including within the City of Oakland, do not increase erosion. A new development or redevelopment project in which the combined amounts of impervious surface created and replaced totals one acre or more is required to comply with the Water Board Order's hydromodification standard and the ACCWP HMMP unless it falls into one of several exempt categories.

Examples of exempt projects include single family homes; transit village redevelopments; and sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features associated with streets, roads, highways, or freeways. Exemptions are also provided for projects served by hardened stormwater conduits and projects in areas near the Bay that are tidally influenced or subject to sediment deposition. Proposed components of the Lake Merritt and Lake Merritt Channel group, the Waterfront Trail group and the Recreational Facilities group lie within areas served by hardened stormwater conduits or are located in exempt areas near the Bay. Many proposed components of the Citywide Creeks group would be constructed in non-exempt areas; however, they would not increase impervious surface area and, in fact, would in some cases remove existing impervious surface. Thus, the proposed project components are exempt from most requirements of the HMMP.

Nevertheless, exempt projects are required to incorporate site design/landscape characteristics, which maximize infiltration (where appropriate), provide retention or detention, slow runoff, and minimize impervious land coverage (i.e., use hydrologic source controls) to the maximum extent practicable.

[38] The Alameda County Public Works Agency, 2005. *Hydrograph Modification Management Plan.* ACCWP, 15 May.

For proposed components in the City-wide Creeks group (and other groups, if applicable), this would be ensured by compliance with the City's Creek Protection Ordinance, which is specifically recognized in the ACCWP HMMP. As a part of standard permit compliance, each proposed component would be evaluated for potential hydromodification impact (based on the project size, location and type of work proposed). If it is determined during the permitting process that hydromodification impacts could occur for one or more components, those components would be required to comply with HMMP provisions.

(3) Alameda County Flood Control & Water Conservation District. The Alameda County Public Works Agency is responsible for maintaining the infrastructure of Alameda County, including roads, bridges, flood channels and creeks. Flood Control Zone 12 comprises Oakland and Emeryville. Zone 12 includes Temescal, Glen Echo, Pleasant Valley, Trestle Glen, Sausal, Peralta, Courtland, Lion, Arroyo Viejo, Elmhurst, Stonehurst, and San Leandro creeks. Stormwater is conveyed in these waterways, as well as miles of underground pipes and culverts, which ultimately discharge to the Bay. In some cases pump stations are required to convey the water to the Bay for discharge.

Within the Public Works Agency, the Alameda County Flood Control and Water Conservation District plans, designs and inspects construction of flood control projects, maintains flood control infrastructure, and assists in planning new developments.

(4) City of Oakland Municipal Code. Some applicable chapters regarding Hydrology and Water Quality include:

- Chapter 13.16, Creek Protection Stormwater Discharge Control Ordinance. The Oakland Municipal Code prohibits activities that will result in the discharge of pollutants to Oakland's waterways or the damaging of creeks, creek functions, or habitat. The ordinance requires the use of standard Best Management Practices to prevent pollution or erosion to creeks and/or storm drains. Additionally, a creek protection permit is required for any construction work on creek side properties.
- Chapter 15.04, Oakland Amendments to the California Model Building Codes. This chapter of the Oakland Municipal Code shall be known as the "Oakland Amendments of the 2001 edition of the California Building Standards Code, Part 2 (California Building Code), Part 4 (California Mechanical Code), and Part 5 (California Plumbing Code), and the 2004 edition of the California Building Standards Code, Part 3 (California Electrical Code)".

The applicable amendments include, but are not limited to:

- 15.04.780 CBC Appendix Chapter 33 deleted and replaced. Delete CBC Appendix Chapter 33 and insert Ordinance 10446 C. M. S., Erosion and Sedimentation, with revisions as follows: SECTION 3304--GRADING, EXCAVATIONS AND FILLS.
- Chapter 15.04.780, Section 3304 - Grading, Excavation and Fills. The Grading Ordinance requires a permit for projects that exceed certain criteria. Subsection 3304.2 defines the terms under which a grading permit will be required.

(5) City of Oakland General Plan Objectives and Policies. The General Plan includes the following objectives and policies pertaining to hydrology and water quality:

- Policy FL-1: Enforce and update local ordinances, and comply with regional orders that would reduce the risk of storm-induced flooding.
- Policy FL-2: Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.

- Policy FL-3: Seek the cooperation and assistance of other government agencies in managing the risk of storm-induced flooding.

(6) City of Oakland Open Space, Conservation, and Recreation (OSCAR) Plan. The OSCAR includes the following Hydrology policy:

- Policy CO-5.1: Encourage groundwater recharge by protecting large open space areas, maintaining setbacks along creeks and other recharge features, limiting impervious surfaces where appropriate, and retaining natural drainage patterns within newly developing areas

(7) City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential hydrologic impacts would be reduced.

Condition 24: Erosion and Sedimentation Control (When no grading permit is required). *Ongoing throughout demolition, grading, and/or construction activities.* Pursuant to Chapter 13.16 of the Oakland Municipal Code, the project applicant shall implement Best Management Practices (BMPs) to reduce erosion, sedimentation, and water quality impacts during construction to the maximum extent practicable. At a minimum, the project applicant shall provide filter materials deemed acceptable to the City at nearby catch basins to prevent any debris and dirt from flowing into the City's storm drain system and creeks.

Condition 43: Erosion and Sedimentation Control Plan. *Prior to any grading activities*

a) The project applicant shall obtain a grading permit if required by the Oakland Grading Regulations pursuant to Section 15.04.780 of the Oakland Municipal Code. The grading permit application shall include an erosion and sedimentation control plan. The erosion and sedimentation control plan shall include all necessary measures to be taken to prevent excessive stormwater runoff or carrying by stormwater runoff of solid materials on to lands of adjacent property owners, public streets, or to creeks as a result of conditions created by grading operations. The plan shall include, but not be limited to, such measures as short-term erosion control planting, waterproof slope covering, check dams, interceptor ditches, benches, storm drains, dissipation structures, diversion dikes, retarding berms and barriers, devices to trap, store and filter out sediment, and stormwater retention basins. Off-site work by the project applicant may be necessary. The project applicant shall obtain permission or easements necessary for off-site work. There shall be a clear notation that the plan is subject to changes as changing conditions occur. Calculations of anticipated stormwater runoff and sediment volumes shall be included, if required by the Director of Development or designee. The plan shall specify that, after construction is complete, the project applicant shall ensure that the storm drain system shall be inspected and that the project applicant shall clear the system of any debris or sediment.

Ongoing throughout grading and construction activities

b) The project applicant shall implement the approved erosion and sedimentation plan. No grading shall occur during the wet weather season (October 15 through April 15) unless specifically authorized in writing by the Building Services Division.

Condition 62: Stormwater Pollution Prevention Plan. *Prior to and ongoing throughout demolition, grading, and/or construction activities.* The project applicant must obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). The project applicant must file a notice of intent (NOI) with the SWRCB. The project applicant will be required to prepare a stormwater pollution prevention plan (SWPPP). At a minimum, the SWPPP shall include a description of construction materials, practices, and equipment storage and maintenance; a list of pollutants likely to contact stormwater; site-specific erosion and sedimentation control practices; a list of provisions to eliminate or reduce discharge of materials to stormwater; Best Management Practices (BMPs), and an inspection and monitoring program. Prior to the issuance of any construction-related permits, the project applicant shall submit a copy of the SWPPP and evidence of approval of the SWPPP by the SWRCB to the Building Services Division. Implementation of the SWPPP shall start with the com-

mencement of construction and continue though the completion of the project. After construction is completed, the project applicant shall submit a notice of termination to the SWRCB.

Condition 63: Drainage Plan for Projects on Slopes Greater than 20%. *Prior to issuance of building permit (or other construction-related permit).* The project drawings submitted for a building permit (or other construction-related permit) shall contain a drainage plan to be reviewed and approved by the Building Services Division. The drainage plan shall include measures to reduce the post-construction volume and velocity of stormwater runoff to the maximum extent practicable. Stormwater runoff shall not be augmented to adjacent properties or creeks. The drainage plan shall include and identify the following:

- All proposed impervious surface on the site;
- Anticipated directional flows of on-site stormwater runoff;
- Site design measures to reduce the amount of impervious surface area and directly connected impervious surfaces;
- Source control measures to limit the potential for stormwater pollution; and
- Stormwater treatment measures to remove pollutants from stormwater runoff.

Condition 64: Site Design Measures for Post-Construction Stormwater Pollution Management. *Prior to issuance of building permit (or other construction-related permit)* The project drawings submitted for a building permit (or other construction-related permit) shall contain a final site plan to be reviewed and approved by Planning and Zoning. The final site plan shall incorporate appropriate site design measures to manage stormwater runoff and minimize impacts to water quality after the construction of the project. These measures may include, but are not limited to, the following:

- Minimize impervious surfaces, especially directly connected impervious surfaces;
- Utilize permeable paving in place of impervious paving where appropriate;
- Cluster buildings;
- Preserve quality open space; and
- Establish vegetated buffer areas.

Ongoing

The approved plan shall be implemented and the site design measures shown on the plan shall be permanently maintained.

Condition 65: Source Control Measures to Limit Stormwater Pollution. *Prior to issuance of building permit (or other construction-related permit)* The applicant shall implement and maintain all structural source control measures imposed by the Chief of Building Services to limit the generation, discharge, and runoff of stormwater pollution.
Ongoing
The applicant, or his or her successor, shall implement all operational Best Management Practices (BMPs) imposed by the Chief of Building Services to limit the generation, discharge, and runoff of stormwater pollution.

Condition 66: Post-Construction Stormwater Pollution Management Plan. *Prior to issuance of building permit (or other construction-related permit)* The applicant shall comply with the requirements of Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) permit issued to the Alameda Countywide Clean Water Program. The applicant shall submit with the application for a building permit (or other construction-related permit) a completed Stormwater Supplemental Form for the Building Services Division. The project drawings submitted for the building permit (or other construction-related permit) shall contain a stormwater pollution management plan, for review and approval by the City, to limit the discharge of pollutants in stormwater after construction of the project to the maximum extent practicable.

a) The post-construction stormwater pollution management plan shall include and identify the following:
   - All proposed impervious surface on the site;
   - Anticipated directional flows of on-site stormwater runoff; and
   - Site design measures to reduce the amount of impervious surface area and directly connected impervious surfaces; and
   - Source control measures to limit the potential for stormwater pollution; and

- Stormwater treatment measures to remove pollutants from stormwater runoff.

b) The following additional information shall be submitted with the post-construction stormwater pollution management plan:
   - Detailed hydraulic sizing calculations for each stormwater treatment measure proposed; and
   - Pollutant removal information demonstrating that any proposed manufactured/mechanical (i.e., non-landscape-based) stormwater treatment measure, when not used in combination with a landscape-based treatment measure, is capable or removing the range of pollutants typically removed by landscape-based treatment measures.

All proposed stormwater treatment measures shall incorporate appropriate planting materials for stormwater treatment (for landscape-based treatment measures) and shall be designed with considerations for vector/mosquito control. Proposed planting materials for all proposed landscape-based stormwater treatment measures shall be included on the landscape and irrigation plan for the project. The applicant is not required to include on-site stormwater treatment measures in the post-construction stormwater pollution management plan if he or she secures approval from Planning and Zoning of a proposal that demonstrates compliance with the requirements of the City's Alternative Compliance Program.

Prior to final permit inspection
The applicant shall implement the approved stormwater pollution management plan.

Condition 67: Maintenance Agreement for Stormwater Treatment Measures. *Prior to final zoning inspection.* For projects incorporating stormwater treatment measures, the applicant shall enter into the "Standard City of Oakland Stormwater Treatment Measures Maintenance Agreement," in accordance with Provision C.3.e of the NPDES permit, which provides, in part, for the following:

- The applicant accepting responsibility for the adequate installation/construction, operation, maintenance, inspection, and reporting of any on-site stormwater treatment measures being incorporated into the project until the responsibility is legally transferred to another entity; and
- Legal access to the on-site stormwater treatment measures for representatives of the City, the local vector control district, and staff of the Regional Water Quality Control Board, San Francisco Region, for the purpose of verifying the implementation, operation, and maintenance of the on-site stormwater treatment measures and to take corrective action if necessary. The agreement shall be recorded at the County Recorder's Office at the applicant's expense.

Condition 68: Erosion, Sedimentation, and Debris Control Measures. *Prior to issuance of demolition, grading, or construction-related permit.* The project applicant shall submit an erosion and sedimentation control plan for review and approval by the City. All work shall incorporate all applicable "Best Management Practices (BMPs) for the construction industry, and as outlined in the Alameda Countywide Clean Water Program pamphlets, including BMP's for dust, erosion and sedimentation abatement per Chapter Section 15.04 of the Oakland Municipal Code. The measures shall include, but are not limited to, the following:

a) On sloped properties, the downhill end of the construction area must be protected with silt fencing (such as sandbags, filter fabric, silt curtains, etc.) and hay bales oriented parallel to the contours of the slope (at a constant elevation) to prevent erosion into the creek.

b) In accordance with an approved erosion control plan, the project applicant shall implement mechanical and vegetative measures to reduce erosion and sedimentation, including appropriate seasonal maintenance. One hundred (100) percent degradable erosion control fabric shall be installed on all graded slopes to protect and stabilize the slopes during construction and before permanent vegetation gets established. All graded areas shall be temporarily protected from erosion by seeding with fast growing annual species. All bare slopes must be covered with staked tarps when rain is occurring or is expected.

c) Minimize the removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Maximize the replanting of the area with native vegetation as soon as possible.

d) All work in or near creek channels must be performed with hand tools and by a minimum number of people. Immediately upon completion of this work, soil must be repacked and native vegetation planted.

e) Install filter materials (such as sandbags, filter fabric, etc.) at the storm drain inlets nearest to the creek side of the project site prior to the start of the wet weather season (October 15); site dewatering activities; street washing activities; saw cutting asphalt or concrete; and in order to retain any debris flowing into the City storm drain system.

Filter materials shall be maintained and/or replaced as necessary to ensure effectiveness and prevent street flooding.

f) Ensure that concrete/granite supply trucks or concrete/plaster finishing operations do not discharge wash water into the creek, street gutters, or storm drains.

g) Direct and locate tool and equipment cleaning so that wash water does not discharge into the creek.

h) Create a contained and covered area on the site for storage of bags of cement, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the storm drain system by the wind or in the event of a material spill. No hazardous waste material shall be stored on site.

i) Gather all construction debris on a regular basis and place them in a dumpster or other container which is emptied or removed on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution.

j) Remove all dirt, gravel, refuse, and green waste from the sidewalk, street pavement, and storm drain system adjoining the project site. During wet weather, avoid driving vehicles off paved areas and other outdoor work.

k) Broom sweep the street pavement adjoining the project site on a daily basis. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the end of each workday, the entire site must be cleaned and secured against potential erosion, dumping, or discharge to the creek.

l) All erosion and sedimentation control measures implemented during construction activities, as well as construction site and materials management shall be in strict accordance with the control standards listed in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Board (RWQB).

m) Temporary fencing is required for sites without existing fencing between the creek and the construction site and shall be placed along the side adjacent to construction (or both sides of the creek if applicable) at the maximum practical distance from the creek centerline. This area shall not be disturbed during construction without prior approval of Planning and Zoning.

n) All erosion and sedimentation control measures shall be monitored regularly by the project applicant. The City may require erosion and sedimentation control measures to be inspected by a qualified environmental consultant (paid for by the project applicant) during or after rain events. If measures are insufficient to control sedimentation and erosion then the project applicant shall develop and implement additional and more effective measures immediately.

Condition 69: Creek Protection Plan. (http://www.oaklandpw.com/creeks) *Prior to and ongoing throughout demolition, grading, and/or construction activities.*

a) The approved creek protection plan shall be included in the project drawings submitted for a building permit (or other construction-related permit). The project applicant shall implement the creek protection plan to minimize potential impacts to the creek during and after construction of the project. The plan shall fully describe in plan and written form all erosion, sediment, stormwater, and construction management measures to be implemented on-site.

b) If the plan includes a stormwater system, all stormwater outfalls shall include energy dissipation that slows the velocity of the water at the point of outflow to maximize infiltration and minimize erosion. The project shall not result in a substantial increase in stormwater runoff volume or velocity to the creek or storm drains.

Condition 74: Dewatering and Diversion for Creekside Properties. *Prior to the start of any in-water construction activities.* The project applicant shall develop and implement a detailed dewatering and diversion plan for review and approval by the Building Services Division. All proposed dewatering and diversion practices shall be consistent with the requirements of the Streambed Alteration Agreement issued by the California Department of Fish and Game.

a) If installing any dewatering or diversion device(s), ensure that construction and operation of the devices meet the standards in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Control Board (RWQCB).

b) Construct coffer dams and water diversion system of a non-erodable material which will cause little or siltation. Maintain coffer dams and the water diversion system in place and functional throughout the construction period. If the coffer dams or water diversion system fail, repair immediately based on the recommendations of a qualified environmental consultant. Remove devices only after construction is complete and the site stabilized.

c) Pass pumped water through a sediment settling device before returning the water to the stream channel. Provide velocity dissipation measures at the outfall to prevent erosion.

Condition 75: Regulatory Permits and Authorization. *Prior to issuance of a demolition, grading, or building permit.* Prior to construction within the floodway or floodplain, the project applicant shall obtain all necessary regulatory permits and authorizations from the Alameda County Flood Control and Water Conservation District and shall comply with all conditions issued by that agency.

Condition 76: Structures within a Floodplain. *Prior to issuance of a demolition, grading, or building permit.*

a) The project applicant shall retain the civil engineer of record to ensure that the project's development plans and design contain finished site grades and floor elevations that are elevated above the Base Flood Elevation (BFE) if established of a 100-year flood event.

b) The project applicant shall submit final hydrological calculations that ensure that the structure will not interfere with the flow of water or increase flooding.

2. Impacts and Mitigation Measures

This section analyzes the impacts related to hydrology and water quality that could result from implementation of the project components. The section begins with criteria of significance, which establish the thresholds for determining whether a project impact is significant. The latter part of this section presents the potential hydrology and storm drainage impacts associated with the proposed project. Mitigation measures are provided, as appropriate.

a. Criteria of Significance. The project would have a significant impact on the environment if it would:

1) Violate any water quality standards or waste discharge requirements;

2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or proposed uses for which permits have been granted);

3) Result in substantial erosion or siltation on- or off-site that would affect the quality of receiving waters;

4) Result in substantial flooding on- or off-site;

5) Create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems;

6) Create or contribute substantial runoff which would be an additional source of polluted runoff;

7) Otherwise substantially degrade water quality;

8) Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, that would impede or redirect flood flows;

9) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

10) Expose people or structures to a substantial risk of loss, injury or death involving flooding;

11) Result in inundation by seiche, tsunami, or mudflow;

12) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course, or increasing the rate or amount of flow, of a Creek, river or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- or off-site; or

13) Fundamentally conflict with elements of the City of Oakland Creek Protection Stormwater and Discharge (OMC Chapter 13.16) ordinance intended to protect hydrologic resources. Although there are no specific, numeric/quantitative criteria to assess impacts, factors to be considered in determining significance include whether there is substantial degradation of water quality through: (a) discharging a substantial amount of pollutants into a creek; (b) significantly modifying the natural flow of the water or capacity; (c) depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or (d) substantially endangering public or private property or threatening public health or safety.

Table IV.H-2: Summary of Potential Impacts – Hydrology and Water Quality

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Violate water quality standards or discharge requirements?	O	O	O	O
2. Deplete groundwater supplies or interfere with groundwater recharge?	O	O	O	O
3. Result in erosion?	O	O	O	O
4. Result in flooding?	O	O	O	O
5. Result in substantial runoff that would exceed stormwater drainage systems?	O	O	O	O
6. Result in substantial polluted runoff?	O	O	O	O
7. Degrade water quality?	**O** HYD-1	**O** HYD-1	**O** HYD-1	**O** HYD-1
8. Place housing in a 100-year flood hazard area?	==	==	==	==
9. Place structures in a 100-year flood hazard that would redirect flood flows?	==	==	==	==
10. Expose people/structures to substantial loss involving flooding?	O	O	O	O
11. Result in inundation by seiche, tsunami, or mudflow?	O	O	O	O
12. Substantially alter existing drainage pattern of the site?	O	O	O	O
13. Conflict with elements of the Oakland Creek Protection Ordinance?	O	O	O	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact

O Less-than-Significant or Less-than-Significant with standard Conditions of Approval

- Reduced to Less-than-Significant after recommended mitigation
- Significant
  NA Not Applicable

HYD-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

b. Impacts and Mitigation Measures Applicable to All Project Groups. Several impacts to hydrology and water quality that may result from the implementation of Measure DD would essentially be the same for each or most of the four project groups. These impacts are defined below for each criterion of significance listed above.

(1) Water Quality (Criteria 1, 3, and 6). Activities proposed by the project would include two phases that could result in impacts to water quality construction and operation.

Construction Period. Some of the proposed Measure DD Project components would require grading and excavation, such as for street realignment and bridge construction projects. Construction, grading, and excavation would require temporary disturbance of surface soils. During the construction period, grading and excavation activities would result in exposure of soil to runoff, and the discharge of groundwater from the excavation, potentially causing erosion and entrainment of sediment in the runoff. Soil stockpiles and excavated areas would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation and pollutants in stormwater. The potential for chemical releases is present at most construction sites given the types of materials used, including fuels, oils, paints, and solvents. Once released, these substances could be transported to Lake Merritt and San Francisco Bay in stormwater runoff, dewatering effluent, wash water, and dust control water, potentially reducing water quality. Deposition resulting from the project could impact aquatic habitat and other beneficial uses of receiving waters.

Compliance with existing programs and ordinances, including the NPDES General Construction Activity permit administered by the State Water Resources Control Board and the City of Oakland Municipal Code section 13.16.100 (City Of Oakland Creek Protection, Storm Water Management and Discharge Control Ordinance) would be required. These programs and ordinances require that the City and/or its designated contractors mitigate potential construction-period water quality impacts for applicable projects. The City and/or its designated contractors would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for each component that includes disturbance of one more acre of land (NPDES requirements).

For example, a Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the implementation of the Lake Merritt Master Plan Park and Street Design of El Embarcadero and Lakeshore Avenue. The SWPPP incorporates construction period Best Management Practices (BMPs) and Post-construction Storm Water Management methods including Site Planning Controls, Non-storm Water Management, and Maintenance, Inspection and Repair of structural controls in perpetuity.[39]

For those project components that would disturb less than one acre of land, the Oakland Municipal Code “prohibits activities that will result in the discharge of pollutants to Oakland's waterways or the

[39] Sandis, Humber, Jones, 2005, Storm Water Pollution Prevention Plan for Lake Merritt Master Plan Implementation, Park and Street Design of El Embarcadero and Lakeshore Avenue, Oakland CA., November.

damaging of creeks, creek functions, or habitat" and therefore water quality mitigation would still be required.

Operation Period. Under the proposed project, some components (such as the Sports Center, Lake Merritt Parks, and Bay Trail Trailhead facilities) would result in new facilities and parking lots. Sources of urban pollutants, including spills and leaks associated with automobiles, would accompany these new developments. These sources may contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff discharged to receiving waters. Runoff from landscaped areas may contain residual pesticides and nutrients. Runoff from the components eventually enters Lake Merritt and San Francisco Bay, water bodies that are listed as impaired by the Water Board. The Water Board has designated Lake Merritt as impaired due to organic enrichment, low dissolved oxygen, and trash resulting from urban runoff and storm sewer effluent. San Francisco Bay and Oakland Inner Harbor are water quality impaired for several pesticides (chlordane, DDT, diazinon, and dieldrin), dioxin compounds, exotic species, furan compounds, mercury, PCBs, and selenium,[40] and the Water Board has determined that the assimilative capacity of the San Francisco Bay for these pollutants has already been exceeded.

Most contaminants that have been identified as causing the water quality impairment of the Bay and Inner Harbor are unlikely to be used at the Measure DD component sites. Each of the pesticides (chlordane, DDT, diazinon, and dieldrin) has been banned for non-agricultural use and is therefore not available for legal use at the component sites. The source of the dioxin and furan compounds has been identified as atmospheric deposition. The proposed project would not alter the rate of atmospheric deposition, and therefore not change the current loading rate of these compounds. The proposed Measure DD Implementation Project would not introduce exotic species to the Bay or increase the impact of existing exotic species. Mercury would not be used at the site and this project would not be expected to generate discharges of this contaminant. The selenium impairment has been caused by industrial point sources, natural sources, and exotic species; increases in selenium loading would not be expected based on the proposed land uses. The project component draining to Lake Merritt could contribute organic materials and nutrients to Lake discharge.

The existing NPDES program requires that any Measure DD components creating 10,000 square feet of new impervious surface or more, treat runoff prior to discharge using BMPs. The amount of runoff that is typically required to be treated is about 80 to 85 percent of the total average annual runoff from the site (depending on whether a volume-based or flow-based method is used). In general, passive, low-maintenance BMPs (e.g., grassy swales, porous pavements, and stormwater planters) are preferred. Under the existing program, the City would ensure that the project design includes features and operational BMPs to reduce potential impacts to surface water quality associated with operation of the project to the maximum extent practicable. Compliance with the terms of the standard Conditions of Approval associated with regulatory agency approved plans as detailed above would ensure that the impact would be less than significant.

Proposed components of the Lake Merritt and Lake Merritt Channel group, the Waterfront Trail group and the Recreational Facilities group lie within areas served by hardened stormwater conduits or are located in areas near the Bay that are relatively flat and have a low potential for erosion. These areas are exempt from the ACCWP erosion control requirements (hydromodification standards) but

[40] RWQCB, 2003, op. cit.

nevertheless would incorporate site design/landscape characteristics, which maximize infiltration (where appropriate), provide retention or detention, slow runoff, and minimize impervious land coverage (i.e., use hydrologic source controls) to the maximum extent practicable. Many proposed components of the City-wide Creeks group would be constructed in areas with steeper terrain. They would be constructed in accordance with the ACCWP HMMP and the City's Creek Protection Ordinance, which are intended to ensure, among other objectives, that projects do not increase erosion. As noted in Chapter III, Project Description, one of the objectives of the City-wide Creeks group is to control erosion and thus the proposed creek restoration activities would be designed to improve rainfall infiltration, stabilize stream banks and otherwise reduce erosion in the long term.

(2) Groundwater Supplies and Recharge (Criteria 2). Groundwater pumping is not proposed by any component of Measure DD. Groundwater recharge resulting from infiltration of precipitation depends on the type and amount of pervious surface within a watershed. Many components of Measure DD propose to move, replace or reconfigure impervious surfaces such as parking lots and roadways. However, as proposed, the components would result in approximately the same amount of impervious surfaces, and in some cases a reduction in impervious surface area relative to the existing conditions. New landscaping, park areas, and enhanced riparian habitats proposed by the project would likely improve infiltration and groundwater recharge. This potential impact would be less than significant.

(3) Flooding (Criteria 4, 5, 8, 9, 10, and 12). In general, the project components would be either outside the floodplain or designed to improve flood water conveyance and channel stability. For example:

- The project proposes to modify the Lake Merritt Channel shape to increase conveyance and flushing. Preliminary project design has been developed based on hydraulic analyses and mathematical modeling of the flow under the proposed 12th Street Bridge location.[41] Further studies have evaluated the conveyance capacity of the channel and drawdown rates for Lake Merritt based on the modeled configuration and concluded that conveyance capacity of the Channel will be approximately doubled if all channel improvement proposals are fully implemented. The ability of the channel to convey more water out of the Lake to the open water of the Estuary and Bay could alleviate flooding conditions.[42]
- Activities proposed by the City-wide Creeks group of projects are designed to improve the ability of the creeks to convey stormwater, increase streambed and bank stability, minimize erosion and improve water quality. Enhancement in the ability of the creeks to transport stormwater would reduce flooding and erosion hazards.

Substantial quantities of new impervious surfaces, which could increase runoff rates and velocities (and potentially flooding), would not be created by Measure DD project components. Construction of housing is not a proposed element of the project, and no new residential development would be subject to flooding. Therefore, no substantial impact related flood hazard or redirection of flood water would occur with the proposed Measure DD components.

[41] PWA, 2005, Report: City of Oakland, 12th Street Reconstruction Project, PWA Basis of Design Elements, 24 June, PWA#1726.00

[42] PWA, 2007, Memorandum: Lake Merritt Channel Conveyance Capacity, 17 January, PWA#1826/1827

Although a low probability event, structural dam failure can be caused by earthquake or overflow. All dams that could affect Measure DD components are under the jurisdiction of State of California, Division of Safety of Dams. Existing dams under state and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and to direct the owner to correct any identified deficiencies. Regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure.[43] In addition, the types of projects included in Measure DD (none include housing, schools, or critical facilities) are not particularly susceptible to impacts associated with dam failure inundation. This would be a less-than-significant impact.

(4) Degrade Water Quality (Criterion 7). One potentially significant impact related to water quality is described below.

Impact HYD-1 (Groups 1 – 4): Existing groundwater well(s), that may be encountered and/or damaged by proposed project activities, could act as conduits for migration of pollutants to the underlying groundwater aquifer. (S)

Hundreds of wells were formerly located in the East Bay Plain and used for general water supply. Many of these wells were not properly destroyed and may still be present at one or more of the project component sites. If the well was not fitted with an effective sanitary seal when constructed, or if the seal has been damaged since installation or were to be damaged during grading and construction associated with the project, surface water (potentially containing pollutants) could seep into the wells and the underlying aquifer, causing water quality degradation.

> Mitigation Measure HYD-1 (Groups 1 – 4)**:** Any existing wells discovered during the implementation of Measure DD shall be either: 1) properly abandoned in compliance with the California Department of Water Resources California Well Standards and Alameda County Environmental Health Department requirements prior to final approval of the grading plan; or 2) inspected by a qualified professional to determine whether each well is properly sealed at the surface to prevent infiltration of water-borne contaminants into the well casing or surrounding gravel pack. The California Well Standards require an annular surface seal of at least 20 feet. If the wells are found not to comply with this requirement, the City shall retain a qualified well driller to install the required seal. (LTS)

(5) Seiche, Tsunami, or Mudflow (Criterion 11). Those components with an elevation of approximately 10 feet NGVD or higher would be expected to be provided adequate protection from tsunamis, extreme high tides, and sea level rise, all of which tend to present hazards for sites at elevations lower than 10 feet NGVD. [44,45,46,47] Those components at elevations less than 10 feet NGVD are around the perimeter of Lake Merritt, along the Lake Merritt Channel and along the Oakland Estuary

[43] OES, 2006, op. cit.

[44] Houston, J.R., Garcia, A.W., 1975, Type 16 Flood Insurance Study: Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound, Technical Report H-75-17, November.

[45] Ritter, J., Dupre, W., 1972. Maps Showing Areas of Potential Inundation of Tsunamis in the San Francisco Bay Region, California, Department of the Interior, U.S. Geological Survey, Misc. Field Studies, MF480.

[46] United States Army Corps of Engineers (USACE), 1984, San Francisco Bay Tidal Stage vs. Frequency Study, October.

[47] USEPA, 1995, The Probability of Sea Level Rise, EPA 230-R-95-008, October.

and consist of open structures such as the boathouse, bridges, pathways, signage and park land. These types of land uses are not particularly susceptible to impacts associated with sea level rise (as none include housing, schools, or critical facilities). As a result the impact would be less than significant.

Detailed tidal records for the Bay have been maintained for approximately 100 years, and during that time, a damaging seiche has not occurred.[48] A seiche of approximately four inches occurred during the M8.3 1906 earthquake. It is unlikely that the Bay region will experience a larger earthquake than the 1906 event, and therefore a seiche larger than four inches is considered unlikely to occur. Inundation from seiche would represent a less than significant impact.

(6) Creek Protection Ordinance (Criterion 13). Some project components within the Lake Merritt and Lake Merritt Channel, City-wide Creeks and Waterfront Trail groups are subject to the City's Creek Protection Ordinance, and Creek Protection Permits have already been obtained for the Lakeshore Avenue/El Embarcadero and East 18th Street Pier Overlook project components, for example. Conditions of approval for future Creek Protection Permits (Condition 69) will include requirements to minimize erosion and sedimentation in accordance with the Manual of Standards for Erosion and Sediment Control Measures.[49] In addition, Creek Protection Permits will require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) pursuant to Water Board requirements. With the incorporation of these requirements into project approvals, projects funded by Measure DD will have a less-than-significant impact on City creeks or other areas subject to the Creek Protection Ordinance.

c. Impacts Unique to Specific Project Components. Specific impacts associated with hydrology and water quality for select components are described below.

Lake Merritt and Lake Merritt Channel (Group 1). The Lake Merritt and Lake Merritt Channel group consists of approximately 15 individual components of Measure DD. Of these, all are addressed adequately by the requirements described above in Impacts and Mitigation Measures Applicable to All Project Groups. Specifics of the three large components located in Lake Merritt Channel are detailed below:

- Replace 12th Street & Culverts with New Reconfigured 12th Street Bridge;
- Replace Existing 10th Street Bridge with New 10th Bridge; and
- Redesign of Channel at Lake Merritt Flood Control Station at 7th Street.

These three components are designed to improve tidal exchange between Lake Merritt and San Francisco Bay by clearing and broadening the channel to approximately 100 feet. New clear-span bridges would be constructed after removal of existing culverts under 12th and 10th streets and by reconfiguring the channel at 7th Street, resulting in approximately doubling the flow rate through the Lake Merritt Channel.[50,51] These components are also intended to improve pedestrian and bicycle circulation in

[48] A seiche is a standing wave in an enclosed or partly enclosed body of water. Earthquakes may induce seiche in lakes, bays, and rivers. More commonly, wind-driven currents or tides cause seiche.

[49] Association of Bay Area Governments. 1995. *Manual of Standards for Erosion and Sediment Control Measures.* Second edition. Association of Bay Area Governments, Oakland, California. 422 pp.

[50] Rajappan & Meyer Consulting Engineers, 2007, *Lake Merritt Channel Conveyance Capacity: 1826/1827 – Hydraulic Modeling,* prepared for the City of Oakland, 17 January.

the area of the Channel, and along with other components, enhance and improve the environment of Lake Merritt and surrounding parks. Topics of wildlife, aquatic life, vegetation, landscaping, creek restoration, U.S. Army Corps of Engineers Section 404 (filling and grading in wetlands) permitting, California Department of Fish and Game Section 1604 – Streambed Alteration Agreements, and San Francisco Bay Conservation and Development Commission (BCDC) requirements are addressed in the Biological Resources section of this DEIR.

The work at 10th and 7th Streets would use many of the same techniques during the construction phase to protect water quality as the 12th Street project. These techniques include performing shoreline and foundation works in a 'dry' environment by constructing cofferdams around the shoreline installations and filtering and removing the water from the work site. The City of Oakland would require that the contractor(s) acquire a Creek Protection Permit and, in accordance with the City's Standard Conditions of Approval develop and implement an Erosion Control Plan (ECP) and other measures protective of water quality for each component (Conditions 43, 69, and 74). During the dewatering process, removed water would be passed through a sediment-settling device before being returned to the channel. The contractor would use erosion control methods drawn from the Association of Bay Area Governments Standards for Erosion and Sediment Control and the San Francisco Regional Water Quality Control Board's Erosion and Sediment Control Field Manual.[52,53] Operation period water quality management practices proposed include the installation of bio-swales, detention basins and drainage inlets with filters to improve stormwater runoff water quality.[54] The operational period storm water runoff facilities would be required to treat at least 85 percent of the average annual runoff from the site. In addition, the channel banks would be stabilized and armored to reduce scouring and erosion along the channel, decreasing or eliminating erosion. The City of Oakland's Open Space Conservation and Recreation Element of the General Plan calls for the daylighting of creeks and removal of culverts within the city limits as a means of restoring natural creek ecosystems, and hence improving water quality. Compliance with the requirements as detailed above would ensure that the potential impacts to hydrology and water quality from the Channel projects are less than significant.

Waterfront Trail (Group 2). This component has no impacts beyond those described above in Impacts and Mitigation Measures Applicable to All Project Groups.

Recreational Facilities (Group 3).

Studio One Art Center. This component has no impacts beyond those described above in Impacts and Mitigation Measures Applicable to All Project Groups.

East Oakland Sports Complex. Schematic drawings prepared for this 14-acre component indicate ground water elevations to be four to ten feet COO (City of Oakland Datum) and a dewatering plan would be required. It is proposed to import approximately 12,500 cubic yards of fill and the site would be reshaped to generally slope from the center towards the site perimeter. The schematic site

[51] Rajappan & Meyer Consulting Engineers, 2005, *City of Oakland 12th Street Reconstruction Project: PWA Basis of Design Elements*, prepared for Philip Williams & Associates, Ltd., 24 June.

[52] City of Oakland Municipal Code, Section 3305 – Erosion and Sediment Control.

[53] City of Oakland, 2007, Environmental Services Division, *Oakland Sustainable Design Guide*, accessed at: www.oaklandpw.com/Page46.aspx, 20 April.

[54] Rajappan & Meyer Consulting Engineers, Inc., 2005, op. cit.

plans also propose extensive use of water-filtering bio-swales and a 5,000 square foot detention basin near Edes Avenue in the final configuration.[55] Compliance with existing programs and ordinances, the City of Oakland Standard Conditions of Approval, the NPDES General Construction Activity permit administered by the State Water Resources Control Board and the City of Oakland Municipal Code section 13.16.100 (City Of Oakland Creek Protection, Storm Water Management and Discharge Control Ordinance) would be required. These programs and ordinances require that the City and/or its designated contractors mitigate potential construction-period and operational water quality impacts for applicable projects. The City and/or its designated contractors would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for any component that includes disturbance of one more acre of land (NPDES requirements). Compliance with the requirements as detailed above would ensure that the potential impacts to hydrology and water quality from the Channel projects is less than significant.

City-wide Creeks (Group 4). This component has no impacts beyond those described above in Impacts and Mitigation Measures Applicable to All Project Groups.

[55] ELS Architecture and Urban Design; Murakami/Nelson, 2003, *op. cit*.

I. GEOLOGY, SOILS AND SEISMICITY

This section describes the existing geologic setting, including soils and seismicity, for the Measure DD Project and its component sites. This section also assesses potential impacts from strong ground shaking, fault rupture, liquefaction, slope failure, lateral slope deformation, differential settlement and unstable or expansive soils. Mitigation measures for the identified significant impacts are provided, as appropriate.

1. Setting

This section discusses the methods used for analyzing geological conditions of the Measure DD Project area. The existing geologic conditions for each of the four groups of project components are described, as well as governmental regulations related to geology affecting the project components.

a. Methods. The project area's geologic setting described below is based on a site reconnaissance, published and unpublished regional and local area geologic reports and maps, and available site-specific technical reports.

b. Existing Geologic Conditions. The Measure DD group areas are located within the Coast Ranges Geomorphic Province, a geologically young and seismically-active region on the western margin of the North American plate. In general, the uplands of the Coast Ranges are composed of sedimentary and metamorphic bedrock and the intervening valleys are filled with layers of recent alluvium.[1] The flat area of the East Bay west of the Hayward Fault is a gently sloping alluvial plain. The sediments of the alluvial plain were eroded from the relatively young East Bay Hills. These flats have been expanded along the margins of San Francisco Bay, particularly along the Alameda and Oakland shoreline, by the addition of artificial fill over unconsolidated Young Bay Mud (Bay Mud).[2]

(1) Lake Merritt and Lake Merritt Channel (Group 1). The Lake Merritt and Lake Merritt Channel group includes recreational, building, roadway, and water quality improvements. Proposed roadway improvements include clear-span bridges to replace the current structures at 10th and 12th Streets where the Lake Merritt Channel is culverted. Also proposed is a redesign of the Lake Merritt flood control facility at 7th Street to improve tidal exchange and to allow recreational access between Lake Merritt and San Francisco Bay. Extensive reconfiguration of roadways and parking areas around the perimeter of Lake Merritt is also planned, as are repairs to buildings, retaining walls and overlook structures. Existing geologic conditions of the Lake Merritt and Lake Merritt Channel group area are described below.

Geology. In general, areas of less than 10 feet elevation mean sea level (msl) adjacent the shoreline of Lake Merritt and along the Lake Merritt channel are artificial fill over Bay Mud. Where slopes rise above this level, both west of Lake Merritt and southeast of the Lake Merritt Channel, the near surface deposits are mapped as Merritt Sand (beach and dune sand) likely of Pleistocene age (more than 10,000 and less than 1.8 million years old). To the east and north of the Lake, and beyond

[1] California Geological Survey, 2002, *California Geomorphic Provinces, Note 36.*

[2] Sloan, Doris, 2006, *Geology of the San Francisco Bay Region*, University of California Press.

the artificial fill, are gentle hills composed of a medium grained alluvium of about the same age as the Merritt Sand.[3]

A site-specific soil investigation conducted for a construction project in the Lake Merritt Channel at 7th Street indicated surface materials consist of up to 24 feet of poorly compacted fill composed of sandy clay, rock fragments, concrete rubble and debris. Underlying the fill is a medium dense sand or sandy gravel and Bay Mud to a depth of approximately 59 feet. Underlying the Bay Mud is intermittent layers of loose to medium dense clayey sands and dense green sands to about 74 feet, and under that very stiff sandy clay and clay.[4]

A site-specific geotechnical investigation done in support of the 12th Street Reconstruction component notes that, in general, the 15 test borings performed encountered five to seven feet of clayey, gravelly sand fill over alluvial and estuarine (Bay Mud) deposits. The Bay Mud is saturated, low density, compressible, and sometimes expansive in nature. Deeper layers consisted of generally stiff to very stiff clays with discontinuous layers of dense sand.[5]

Topography. The components of the Lake Merritt and Lake Merritt Channel group are located along the edges of Lake Merritt and the Lake Merritt Channel. This area is characterized by flat to gently rolling topography and existing ground surface elevations from sea level to about 25 feet msl (at the southwest corner of Snow Park).[6] Several culverted creeks and storm drain collectors empty into the Lake or Channel; however, no open creek or stream channels cross the project site.

Soils. Surface soils of this portion of the project are mapped by the Natural Resource Conservation Service[7] as Urban Land. The Urban Land category is a description for man-made materials and land consisting of heterogeneous fills of (generally) unknown origin usually already developed and covered by paving and structures. Urban land is further categorized as named variants. The three variants in the project area around Lake Merritt and the Channel are Urban land-Baywood, -Tierra, and -Danville complexes. The Soil Survey does not assign capability classification values for describing engineering constraints for the Urban Land types; however, the soil survey provides general characteristics for the sub-types. Urban land-Baywood complex is noted to have rapid permeability, low shrink-swell potential and normal strength. Urban land-Tierra and -Danville complexes are noted to have slow permeability, moderate to high shrink-swell potential and low strength.

(2) Waterfront Trail (Group 2). The Oakland Waterfront Trail is part of the San Francisco Bay Trail. Properties along the Oakland Estuary waterfront designated for parkland or trail development within Measure DD would be acquired and remediated, as needed. The work may include demolition, refurbishment or replacement of structures as well as trail construction and

[3] Helley, E.J., LaJoie, K.R., 1979, *Flatlands Deposits of the San Francisco Bay Region, California – Their Geology and Engineering Properties, and Importance to Comprehensive Planning*, USGS Professional Paper 943.

[4] Woodward, Clyde, Sherard & Associates, 1967, Soils Investigation for the Proposed Lake Merritt Seventh Street Pumping and Control Station, Oakland, California, Project # S11195.

[5] Geo/Resources Consultants, Inc., 2006, Geotechnical Investigation 12th Street Reconstruction Project, Oakland, California, April, Report No. 2046-100

[6] USGS, 1959 revised 1980, *Oakland West Quadrangle Topographic Map.*

[7] USDA, Soil Conservation Service, 1981, *Soil Survey of Alameda County, California, Western Part.* March.

restoration of shoreline edges to tidal wetlands. The trail and park parcels for the proposed Oakland Waterfront Trail components are located along the eastern shore of the Oakland Estuary. Existing geologic conditions in the vicinity of the Waterfront Trail components are described below.

Geology. With the exception of an area between approximately the 29th Street and High Street Bridges, the geology of the Oakland Estuary shoreline consists of artificial fill over Bay Mud. The near-surface materials of the area between the bridges noted above is classified as Merritt Sand, a relatively young, poorly consolidated beach and dune sand[8] and/or alluvial fan deposits.[9] The tidal canal in this area is a dredged man-made link connecting Brooklyn Basin with San Leandro Bay[10] and was cut through the alluvial deposit/Merritt Sand connection to what is now the Island of Alameda in 1902.[11]

A conceptual level geotechnical study for the trail crossings at Park, Fruitvale and High Streets notes that the subsurface foundation soils in this area likely consist of stiff to very stiff layers of clay and sand.[12]

The geotechnical evaluation conducted for the 66th Avenue Gateway project component notes exploratory borings at the site encountered both natural and artificial materials in the subsurface. In general, artificial fill to depths down to 20 feet overlaid alternating layers of Bay Mud and alluvium. There were localized areas of asphalt concrete with dense sub-base materials encountered near the surface.[13]

At the Cryer Park site three test borings were drilled to a depth of 20 feet. Artificial fill materials, consisting of stiff to very stiff silty clay, medium dense clayey sand, and some wood debris were encountered to a depth of four feet. Underlying the fill, highly plastic clay (Bay Mud) was encountered to depths of up to about ten feet. Beyond this to the terminal depth of the borings was very stiff clay.[14]

Topography. The components of the Oakland Waterfront Trail group are located along 6.6 miles of the eastern shore of the Oakland Estuary and Tidal Canal, an area with flat topography and an existing ground surface elevation from sea level to about eight feet msl.[15] Engineered channels,

[8] Helley, E.J., LaJoie, K.R., 1979, op. cit.

[9] Graymar, R.W., 2000, *Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California,* USGS Misc. Field Studies MF-2342, V. 1.0.

[10] Sowers, Janet M., William Lettis & Associates, Inc., 1993, revised 1995 & 2000, *Creek & Watershed Map of Oakland and Berkeley,* Oakland Museum of California.

[11] City of Alameda Website, *A Brief History of Alameda,* accessed 2-10-07: http://www.ci.alameda.ca.us/community/

[12] Kleinfelder, Inc., 2005, Letter: Conceptual-Level Geotechnical Study, Proposed Oakland Waterfront Trail, File No. 58402.

[13] Ninyo & Moore, 2005, *Geotechnical Evaluation 66th Avenue Gateway Project, Oakland, Ca.,* Project No. 401058001, April 14.

[14] Kleinfelder, Inc., 2006, *Geotechnical Study, Proposed Cryer Site Park, Embarcadero and Dennison Streets, Oakland, CA,* File No. 64087, January 11.

[15] USGS, 1959 revised 1980, op. cit.

culverted creeks, storm drain collectors and small creeks cross the project site and empty into the Estuary and Channel.

Soils. Surface soils of this portion of the project are mapped by the Natural Resource Conservation Service[16] as Urban Land. The Urban Land category is a description for man-made materials and land, usually already developed and covered by paving and structures, and consisting of heterogeneous fills of (generally) unknown origin.

(3) Recreational Facilities (Group 3). The two components within this group are the renovation of the historic Studio One Art Center, located in North Oakland and the construction of an East Oakland Sports Complex. Existing geologic conditions of and around these facilities are described below.

Studio One Art Center. The building is in the process of being extensively refurbished, including seismic retrofitting with completion of improvements anticipated in 2007.

Geology. The geology of this component site consists of Holocene age alluvial fan deposits layered over Pleistocene age alluvial deposits. In general, these deposits are moderately coarse and poorly sorted. They increase in consolidation and strength with depth. Maximum thickness of these layers is unknown, but the layer is a minimum of 150 feet, tapering thinner towards the east to the foothills and the Hayward Fault.[17]

Topography. This component is located in an area with a gently rolling topography at an elevation of about 110 feet above mean sea level (msl).[18] No open creek or stream channels cross the project site.

Soils. Surface soils of the project site are mapped by the Natural Resource Conservation Service as Urban Land – Danville complex, a mix of about sixty percent Urban Land and thirty percent Danville with the remainder being Botella loam, Clear Lake clay and Tierra loam.[19] Danville soil is a deep soil with slow permeability, high shrink-swell potential and low strength. The Soil Survey does not assign capability classification values for describing engineering constraints for the Urban Land – Danville complex type.

East Oakland Sports Complex. This component is in the conceptual design phase, and site-specific geotechnical information was not available.

Geology. The geology of this component site consists of Holocene age braided natural levee and alluvial basin deposits layered over Pleistocene age alluvial deposits. In general, these deposits are moderately coarse and poorly sorted. They increase in consolidation and strength with depth.

[16] USDA, Soil Conservation Service, 1981, op. cit.

[17] Helley, E.J., LaJoie, K.R., 1979, op. cit.

[18] USGS, 1959 revised 1980, op. cit

[19] Natural Resources Conservation Services (NRCS), 2006. *Soil Survey Of Alameda County, California, Western Part.* Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Maximum thickness of these layers is unknown, but the layer is a minimum of 150 feet, tapering thinner towards the foothills to the east.[20]

Topography. The project site is nearly flat, rising gently from an elevation of about ten feet above mean sea level (msl) at the western extreme to about 14 feet msl to the east.[21] No open creek or stream channels appear to cross the project site.

Soils. Surface soils of the project site are mapped by the Natural Resource Conservation Service as Clear Lake Clay, zero to two percent slope.[22] Typically this is a very deep poorly drained soil formed in alluvium in basins. This soil type has a high shrink-swell potential, low strength, and generally exists in areas with a high water table; depth to water is frequently only four to five feet.

(4) City-wide Creeks (Group 4). Oakland's watershed has fifteen main creeks with over thirty tributaries that comprise over 40 miles of open creeks. The creek components are spread throughout the City of Oakland.

Geology. San Francisco Bay is a drowned river valley atop the tectonically derived Bay Block.[23] The Bay Block lies between the Hayward and San Andreas Faults, and is tilted and sunken to the east. Beyond the Hayward Fault the East Bay Block is elevated relative to the Bay Block. The western face of the East Bay Block constitutes the Berkeley and Oakland Hills. Erosion from these East Bay Hills spread west towards the San Francisco Bay in alluvial fans. The individual creek components of the City-wide Creeks portion of Measure DD are located on both sides of the Hayward Fault and continue to carry sediment down from the still rising East Bay Hills toward the Bay.[24]

Topography. The topography of the City of Oakland is varied. Primarily, it consists of the broad shallow slopes of the alluvial plains starting at San Francisco Bay and the Oakland Estuary with elevations of sea level up to approximately 120 to 200 feet msl at the base of the foothills. Continuing east, the gently rolling uplands areas rise into foothills, and then, generally east of the Hayward Fault, into more and more steep terrain of the East Bay Hills, rising to elevations near the eastern border of the City of Oakland of approximately 1440 feet msl.[25]

Soils. The generalized soil map for western Alameda County depicts two primary soil types for the areas where the creek components are located. The upland terraces, with relatively modest slopes, are Tierra-Urban Land. Tierra soils formed from alluvium are level to moderately steep and moderately well drained loams. The erosion hazard tends to mirror the slope, with steep areas being highly prone to erosion.

[20] Graymer, R.W., 2000, op. cit.

[21] USGS, 1959 revised 1980, op. cit.

[22] NRCS, 2006. op. cit.

[23] The outer shell of the Earth is comprised of large tectonically derived plates. In the SF Bay area, where the Pacific Plate moves north past the North American Plate along the San Andreas Fault System, several large 'blocks', their edges defined by the lesser faults of the San Andreas Fault System, have accumulated. A frequently confused term 'terrane', defines packets of rock by type or source, and may cross block boundaries.

[24] Sloan, Doris, 2006, op. cit.

[25] USGS, 1959 revised 1980, op. cit.

The upland areas of the foothills are soils of the Xeropsamments-Maymen-Millshom series. These soils form from sedimentary rock and occur in steep to very steep foothills; soil quality tends to be poor, while well- to excessively-drained, and with various textures. The soils are prone to erosion, and the depth to the underlying bedrock is shallow.

c. Existing Seismic Conditions. Regional and site specific seismicity are discussed below.

(1) Regional Seismicity. The entire San Francisco Bay Area is located within the San Andreas Fault Zone (SAFZ), a complex of active faults forming the boundary between the North American and Pacific lithospheric plates. Movement of the plates relative to one another results in the accumulation of strain along the faults, which is released during earthquakes. Numerous moderate to strong historic earthquakes have been generated in northern California by the SAFZ. The level of active seismicity results in classification of the area as seismic risk Zone 4 (the highest risk category) in the California Building Code. The SAFZ includes numerous faults found by the California Geological Survey under the Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA) to be "active" (i.e., to have evidence of fault rupture in the past 11,000 years). Regional active faults are shown on Figure IV.I-1.

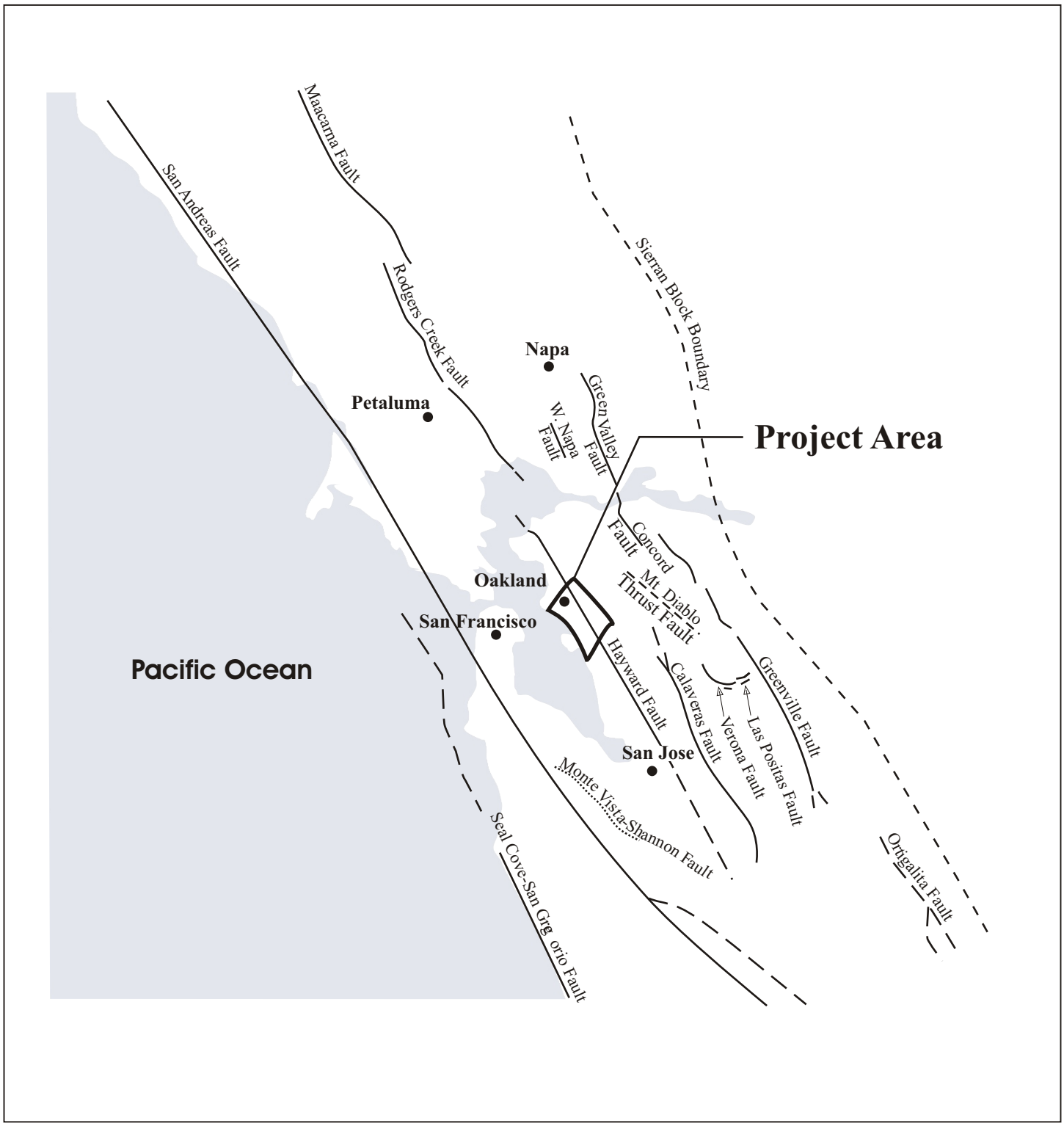
The U.S. Geological Survey's Working Group on California Earthquake Probabilities estimated that there is a 62 percent probability that one or more Moment Magnitude (M_w) 6.7 [26] or greater earthquakes will occur in the San Francisco Bay Area between 2002 and 2031. The probability of a M_W 6.7 magnitude or greater earthquake occurring along individual faults was estimated to be 21 percent along the San Andreas Fault, 27 percent along the Hayward Fault, 11 percent along the Calaveras Fault, four percent along the Concord-Green Valley Fault, ten percent along the San Gregorio Fault, three percent on the Greenville Fault, and three percent for the Mt. Diablo Thrust Fault. In addition, there is a cumulative 14 percent chance of a background (other earthquake source, either mapped or undiscovered) event occurring. When predictions are expanded to 100 years it was estimated that about three M_W6.7 or greater events could occur during that time. Thus the probability of at least one M_W6.7 or greater magnitude earthquake rises to the near certainty of about 96 percent when calculated for a 100-year span.[27]

(2) Project Area Seismicity. A major seismic event in the San Francisco Bay area will have an impact over a broad area. Although the components of Measure DD are discontinuous in location, because of the nature of a major seismic event, they can be considered together in discussing specific seismic concerns affecting them. The Lake Merritt and Lake Merritt Channel, Oakland Waterfront Trail, Recreational Facilities, and City-wide Creeks groups will be subject to the following seismic threats and hazards.

With the exception of the upper reaches of a few of the watercourses of the City-wide Creeks program, none of the components of Measure DD intersect an Alquist-Priolo Earthquake Fault Zone; the nearest A-PEFZ is that of the Hayward Fault, which is located in the East Bay hills. The Hayward

[26] Moment magnitude (M_W) is now commonly used to characterize seismic events as opposed to Richter Magnitude. Moment magnitude is determined from the physical size (area) of the rupture of the fault plane, the amount of horizontal and/or vertical displacement along the fault plane, and the resistance to rupture of the rock type along the fault.

[27] USGS, 2003, *Earthquake Probabilities in the San Francisco Bay Region: 2002 to 2031 – A Summary of Findings*, Open File Report 03-214.



LSA

LEGEND

ACTIVE FAULT – FAULT HAS EVIDENCE OF SURFACE DISPLACEMENT WITHIN THE PAST 11,000 YEARS (DASHED WHERE INFERRED)

POTENTIALLY ACTIVE FAULT – FAULT HAS EVIDENCE OF SURFACE DISPLACEMENT IN THE PAST 1.6 MILLION YEARS, BUT NOT WITHIN THE PAST 11,000 YEARS

SEISMIC SOURCE WITHOUT SURFACE RUPTURE

N

0 10 20
MILES

FIGURE IV.I-1

Oakland Measure DD
Regional Faults

SOURCE: BASELINE ENVIRONMENTAL, 2007.

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fault is a right lateral strike-slip fault with a northwest-southeast axis,[28] and, as noted above, has a 27 percent chance of an M_w6.7 earthquake occurring between 2002 and 2031. Within the City of Oakland, the fault is approximately parallel and beneath State Route 13; then continues south near the route of Interstate 580. With the exception of a few creek watercourses noted above, all the project components are between 1.5 and 3.9 miles southwest of the Hayward A-PEFZA fault zone.[29]

Virtually all the shoreline land and areas of artificial fill around Lake Merritt and the Lake Merritt Channel, the Oakland Estuary and inland as far as artificial fill extends, are mapped by the California Geologic Survey under the terms of California Seismic Hazards Mapping Act to be subject to liquefaction hazards. In addition, the upland areas of Oakland, particularly east of the Hayward Fault are largely mapped as subject to landslide hazards. [30, 31] Most of the components of Measure DD, particularly the components including built structures such as bridges and buildings, are located in areas mapped by the State of California as being subject to one of these hazards.

d. Seismic and Geologic Hazards. Seismic and geological hazards applicable to the project area are discussed below.

(1) Surface Rupture. Surface rupture occurs when the ground surface is broken due to fault movement during an earthquake. The location of surface rupture generally can be assumed to be along an active or potentially active major fault trace. The City-wide Creeks group (though specific plans are not yet developed) includes components on Palo Seco Creek, Lion Creek and Arroyo Viejo Creek. These creeks components, and possibly other plans yet to be defined, cross the Hayward Fault Zone and some of the creek components may subject to the potential for fault rupture.

(2) Ground Shaking. Ground shaking is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. The extent of ground shaking is controlled by the magnitude and intensity of the earthquake, distance from the epicenter, and local geologic conditions. The Modified Mercalli Intensity Scale (MMI) is the most commonly used scale for measurement of the subjective effects of earthquake intensity (shown in Table IV.I-1). A related concept, Peak Ground Acceleration, is measured as a fraction or percentage of gravity (*g*).[32]

The closest active fault to the project site is the Hayward Fault. The north and south Hayward faults together are considered capable of generating about an M_w 6.9 earthquake. An earthquake of this

[28] Right-lateral: if the trace of the fault were viewed while standing on one side during an event, it would appear that the ground on the other side of the fault moved to the right. Strike-slip: the sides are moving laterally relative to each other with little or no vertical movement.

[29] California Division of Mines and Geology (CDMG), 1982, *State of California Special Studies Zones, Oakland West Quadrangle Map.*

[30] California Geological Survey, 2003, *State of California Seismic Hazard Zones, Oakland East7.5-Minute Quadrangle Map.*

[31] California Geological Survey, 2003, *State of California Seismic Hazard Zones, Oakland West 7.5-Minute Quadrangle Map.*

[32] The acceleration due to gravity, denoted *g* (also gee) is a unit of acceleration defined as approximately 32 ft/s^2, which is the acceleration due to gravity on the Earth's surface at sea level.

Table IV.I-1: Modified Mercalli Scale[a]

Category	Description
I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII	Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted.

[a] Source: California Geological Survey, 2002, *How Earthquakes and Their Effects are Measured*: Note 32

magnitude would generate violent to very violent seismic shaking (MMI IX-X) throughout the City of Oakland.[33]

(3) Peak Ground Acceleration. Estimates of the peak ground acceleration have been made for the Bay Area based on probabilistic models that account for multiple seismic sources. Under these

[33] ABAG Earthquake Program, 2004. *Earthquake Shaking Scenario Map*, http://www.abag.ca.gov.

models, consideration of the probability of expected seismic events is incorporated into the determination of the level of ground shaking at a particular location. The expected peak horizontal acceleration (with a ten percent chance of being exceeded in the next 50 years) generated by any of the seismic sources potentially affecting the project area, is estimated by the California Geological Survey as 0.65 adjacent the Oakland Estuary, and approximately 0.80 in the immediate vicinity of the Hayward Fault.[34]

(4) Liquefaction and Lateral Spreading. Liquefaction is the temporary transformation of loose, saturated granular sediments from a solid state to a liquefied state as a result of seismic ground shaking. In the process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure to occur. Since saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is located at greater depths.

As mentioned above, based on mapping conducted for the State of California Seismic Hazards Act, the project area adjacent the Oakland Estuary, Lake Merritt Channel and most of Lake Merritt shoreline is mapped as a liquefaction hazard area by California Geological Survey as is the area of the East Oakland Sport Complex component. The Studio One component is not in a mapped liquefaction hazard area.

Lateral spreading is a form of horizontal displacement of soil toward an open channel or other "free" face, such as an excavation boundary. Lateral spreading can result from either the slump of low-cohesion unconsolidated material or more commonly by liquefaction of either the soil layer or a subsurface layer underlying soil material on a slope.[35] The lateral spreading hazard will tend to mirror the liquefaction hazard for a site, but needs an open channel or "free" face to expand into; this can include temporary excavations resulting from a construction activity.

(5) Expansive Soils. Expansion and contraction of volume can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). During these cycles, the volume of the soil changes markedly. As a consequence of such volume changes, structural damage to buildings and infrastructure may occur if the potentially expansive soils were not considered in project design and during construction.

Those project areas that are mapped as Urban Land are comprised of surface soils made up of un-engineered fill. Urban Land (man-made fill) can be composed of varying amounts of natural soil materials, construction debris, dredging materials, municipal solid waste and other fill.[36] Urban Land variants, such as Urban Land - Danville complex are rated as moderate to highly expansive.[37] The NRCS does not assign engineering properties to soils of the Urban Land classification as they are

[34] California Geological Survey, 2005, *Probabilistic Seismic Hazards Mapping Ground Motion Page*, accessed 2/11/2007, www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html

[35] Rauch, Alan F., 1997, EPOLLS: An Empirical Method for Predicting Surface Displacements due to Liquefaction-Induced Lateral Spreading in Earthquakes, Ph. D. Dissertation, Virginia Tech, Blacksburg, VA.

[36] Scheyer, J.M., and K.W. Hipple. 2005. Urban Soil Primer. United States Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska (http://soils.usda.gov/use).

[37] NRCS, 2006. op. cit.

variable in content and characteristics; however, expansive soils are frequently a component of Urban Land fill.

(6) Slope Stability. Slope failure can occur as either rapid movement of large masses of soil ("landslide") or slow, continuous movement ("creep"). The primary factors influencing the stability of a slope are: 1) the nature of the underlying soil or bedrock; 2) the geometry of the slope (height and steepness); 3) rainfall; and 4) the presence of previous landslide deposits.

Regional mapping shows that the project area of the Oakland Estuary, Lake Merritt Channel and Lake Merritt shoreline mapped as Category 1A; Unstable, defined as "areas of zero to five percent slope that include tidelands, marshlands, and swamplands that are underlain by moist, unconsolidated muds." The exception to this would be those areas between approximately the 29th and High Street Bridges, and the sites for both the East Oakland Sports Complex and the Studio One Art Center, which are mapped as Category 1; stable, defined as "areas of zero to five percent slope that are not underlain by landslide deposits." Finally, the upland areas where the components of the City-wide Creeks group are located in the East Bay Hills are a mosaic of category 3, 4 and 5 lands; and classified as marginally stable to unstable. Unstable areas are those that are underlain by, or adjacent to, landslide deposits.[38]

(7) Settlement and Differential Settlement. Differential settlement or subsidence could occur if buildings or other improvements were built on low-strength foundation materials (including imported non-engineered fill) or if improvements straddle the boundary between different types of subsurface materials (e.g., a boundary between native material and fill). Although differential settlement generally occurs slowly enough that its effects are not dangerous to inhabitants, it can cause significant building damage over time. Portions of the project site that may contain loose or uncontrolled (non-engineered) fill may be susceptible to differential settlement.

e. Regulatory Context. The regulatory context for geological conditions is described in the following paragraphs.

(1) Alquist-Priolo Earthquake Fault Zoning Act. The Alquist-Priolo Special Studies Fault Zoning Act was signed into law December 22, 1972, and went into effect March 7, 1973. The Act, codified in the Public Resources Code as Division 2, Chapter 7.5, has been amended eleven times. The purpose of this Act is to prohibit the location of most structures for human occupancy across the traces of active faults and to thereby mitigate the hazard of fault rupture (Section 2621.5). The Act was renamed the Alquist-Priolo Earthquake Fault Zoning Act effective January 1, 1994. Under the Act, the State Geologist is required to delineate "Earthquake Fault Zones" along known active faults in California. Cities and counties affected by the zones must regulate certain development "projects" within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. The California State Mining and Geology Board provides additional regulations (Policies and Criteria) to guide cities and counties in their implementation of the law (California Code of Regulations, Title 14, Div. 2). The program provides up to date information of the location of active faults that can be used to evaluate other seismic hazards (other than rupture).

[38] Nilson, Tor H., and Wright, Robert H., 1979. *Relative Slope Stability and Land-use Planning In The San Francisco Bay Region, California,* USGS Professional Paper 944, USGS & HUD, Washington D.C.

(2) Seismic Hazards Mapping Act. The State of California Seismic Hazards Mapping Act (the Act) of 1990 (Public Resources Code, Chapter 7.8, Division 2) directs the California Department of Conservation, California Geological Survey to delineate seismic hazard zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and state agencies are directed to use the seismic hazard zone maps in their land-use planning and permitting processes. They must withhold development permits for a site within a zone until the geologic and soil conditions of the project site are investigated and appropriate mitigation measures, if needed, are incorporated into development plans. The Act also requires sellers (and their agents) of real property within a mapped hazard zone to disclose at the time of sale that the property lies within such a zone. Evaluation and mitigation of seismic hazards are to be conducted under guidelines adopted by the California State Mining and Geology Board.[39]

(3) CCR, Title 24 - California Building Standards Code. California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code, is a compilation of building standards for structures for which a building permit is sought. Of the various sections of Title 24, Part 2 comprises the California Building Code (CBC) and incorporates the general standards for the design and construction of buildings, including seismic safety.

(4) City of Oakland Municipal Code. Some applicable chapters regarding geology include:

- Chapter 15.04, Oakland Amendments to the California Model Building Codes. This chapter of the Oakland Municipal Code shall be known as the "Oakland Amendments of the 2001 edition of the California Building Standards Code, Part 2 (California Building Code), Part 4 (California Mechanical Code), and Part 5 (California Plumbing Code), and the 2004 edition of the California Building Standards Code, Part 3 (California Electrical Code)."
- Chapter 15.04.780, Section 3304 - Grading, Excavation and Fills. The Grading Ordinance requires a permit for projects that exceed certain criteria. Subsection 3304.2 defines the terms under which a grading permit will be required.
- Chapter 15.20, Geologic Reports. This chapter mitigates the hazard due to fault rupture by limiting the placement of structures for human occupancy across the trace of active faults. This chapter applies to any new structures, major additions or alterations to any existing structures, replacements of existing structures and subdivisions located wholly or partly within the Special Studies Zone. The City requires a geologic report defining and delineating any fault hazard prior to the approval of a project, and requires that no structures for human occupancy shall be permitted to be placed: 1) across an active fault trace; 2) within fifty (50) feet of any active fault trace unless the geologic investigation can demonstrate that the site is not underlain by active branches of the fault.

(5) City of Oakland General Plan Policies. The following policies and action items from the Safety Element of the City of Oakland General Plan[40] specifically address soils, geology and/or seismic hazards and are applicable to the proposed project.

- Policy GE-1: Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena.
- Policy GE-2: Continue to enforce ordinances and implement programs that seek specifically to reduce the landslide and erosion hazards.

[39] California Geological Survey, 2003, Seismic Hazard Zone Report for the Oakland East 7.5-Minute Quadrangle, Alameda County, Ca.

[40] City of Oakland, 1994, *General Plan Safety Element,* accessed 2-11-07 http://www.oaklandnet.com/-government/SE/Chapter3.pdf

- Policy GE-3: Continue, enhance or develop regulations and programs designed to minimize seismically related structural hazards from new and existing buildings.
- Policy GE-4: Work to reduce potential damage from earthquakes to "lifeline" utility and transportation systems.
- Policy CO-1.1: Soil loss in new development. Regulate development in a manner which protects soil from degradation and misuse or other activities which significantly reduce its ability to support plant and animal life. Design all construction to ensure that soil is well secured so that unnecessary erosion, siltation of streams, and sedimentation of water bodies does not occur.
- Policy CO-1.2: Soil contamination hazards. Minimize hazards associated with soil contamination through the appropriate storage and disposal of toxic substances, monitoring of dredging activities, and clean up of contaminates sites. In this regard, require soil testing for development of any site (or dedication of any parkland or community garden) where contamination is suspected due to prior activities on the site.
- Policy CO-2.2: Unstable geologic features. Retain geologic features known to be unstable, including serpentine rock, areas of known landsliding, and fault lines, as open space. Where feasible, allow such lands to be used for low-intensity recreational activities.
- Policy CO-2.3: Development on filled soils. Require development on filled soils to make special provisions to safeguard against subsidence and seismic hazards.

(6) City of Oakland's Standard and Uniformly Applied Conditions of Approval.

The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential geology impacts would be reduced.

Condition 24: Erosion and Sedimentation Control (When no grading permit is required). *Ongoing throughout demolition grading, and /or construction activities.* Pursuant to Chapter 13.16 of the Oakland Municipal Code, the project applicant shall implement Best Management Practices (BMPs) to reduce erosion, sedimentation, and water quality impacts during construction to the maximum extent practicable. At a minimum, the project applicant shall provide filter materials deemed acceptable to the City at nearby catch basins to prevent any debris and dirt from flowing into the City's storm drain system and creeks.

Condition 43: Erosion and Sedimentation Control Plan. *Prior to any grading activities.*

a) The project applicant shall obtain a grading permit if required by the Oakland Grading Regulations pursuant to Section 15.04.780 of the Oakland Municipal Code. The grading permit application shall include an erosion and sedimentation control plan. The erosion and sedimentation control plan shall include all necessary measures to be taken to prevent excessive stormwater runoff or carrying by stormwater runoff of solid materials on to lands of adjacent property owners, public streets, or to creeks as a result of conditions created by grading operations. The plan shall include, but not be limited to, such measures as short-term erosion control planting, waterproof slope covering, check dams, interceptor ditches, benches, storm drains, dissipation structures, diversion dikes, retarding berms and barriers, devices to trap, store and filter out sediment, and stormwater retention basins. Off-site work by the project applicant may be necessary. The project applicant shall obtain permission or easements necessary for off-site work. There shall be a clear notation that the plan is subject to changes as changing conditions occur. Calculations of anticipated stormwater runoff and sediment volumes shall be included, if required by the Director of Development or designee. The plan shall specify that, after construction is complete, the project applicant shall ensure that the storm drain system shall be inspected and that the project applicant shall clear the system of any debris or sediment.

Ongoing throughout grading and construction activities.

b) The project applicant shall implement the approved erosion and sedimentation plan. No grading shall occur during the wet weather season (October 15 through April 15) unless specifically authorized in writing by the Building Services Division.

Condition 48: Geotechnical Report.

a) A site-specific, design level, Landslide or Liquefaction geotechnical investigation for each construction site within the project area shall be required as part if this project. Specifically:

Each investigation shall include an analysis of expected ground motions at the site from identified faults. The analyses shall be accordance with applicable City ordinances and polices, and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from identified faults.

The investigations shall determine final design parameters for the walls, foundations, foundation slabs, surrounding related improvements, and infrastructure (utilities, roadways, parking lots, and sidewalks).

The investigations shall be reviewed and approved by a registered geotechnical engineer. All recommendations by the project engineer, geotechnical engineer, will be included in the final design, as approved by the City of Oakland.

The geotechnical report shall include a map prepared by a land surveyor or civil engineer that shows all field work and location of the "No Build" zone. The map shall include a statement that the locations and limitations of the geologic features are accurate representations of said features as they exist on the ground, were placed on this map by the surveyor, the civil engineer or under their supervision, and are accurate to the best of their knowledge.

Recommendations that are applicable to foundation design, earthwork, and site preparation that were prepared prior to or during the projects design phase, shall be incorporated in the project.

A peer review is required for the Geotechnical Report. Personnel reviewing the geologic report shall approve the report, reject it, or withhold approval pending the submission by the applicant or subdivider of further geologic and engineering studies to more adequately define active fault traces.

Final seismic considerations for the site shall be submitted to and approved by the City of Oakland Building Services Division prior to commencement of the project.

b) Tentative Tract or Parcel Map approvals shall require, but not be limited to approval of the Geotechnical Report.

2. Impacts and Mitigation Measures

This section analyzes the impacts related to geology, soils and seismicity that could result from implementation of the Measure DD Project. The section begins with criteria of significance, which establish the thresholds for determining whether a project impact is significant. The latter part of this section presents the potential geologic, soils and seismic impacts associated with the proposed project. Mitigation measures are provided, as appropriate.

a. Criteria of Significance. The project would have a significant impact on the environment if it would:

1) Expose people or structures to substantial risk of loss, injury, or death involving:

   a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map or Seismic Hazards Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publications 42 and 117 and PRC §2690 et. seq.);

   b) Strong seismic ground shaking;

   c) Seismic-related ground failure, including liquefaction, lateral spreading, subsidence, collapse; or

   d) Landslides.

2) Result in substantial soil erosion or loss of topsoil, creating substantial risks to life, property, or creeks/waterways;

3) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as it may be revised), creating substantial risks to life or property;

4) Be located above a well, pit, swamp, mound, tank vault, or unmarked sewer line, creating substantial risks to life or property;

5) Be located above landfills for which there is no approved closure and post-closure plan, or unknown fill soils, creating substantial risks to life or property; or

6) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

The level of geology impacts is discussed in the following section and summarized in Table IV.I-2.

b. Impacts and Mitigation Measures Applicable to All Project Groups. Impacts related to geology, soils, and seismicity that may result from the implementation of Measure DD would essentially be the same for each of the four project groups. These impacts are described below for each criterion of significance listed above.

(1a) Fault Rupture. None of the Measure DD Project components propose to place habitable structures over or within 50 feet of a known active or potentially active earthquake fault. The Lake Merritt, Waterfront Trail, or Recreational Facilities are not located adjacent to any known active or potentially active faults. The activities of the City-wide Creeks group involve creek restoration activities such as riparian habitat restoration, bank stabilization, public education displays, erosion control and reintroduction of native wildlife, but not habitable structures. Creek restoration and related projects would not be particularly susceptible to damage associated with fault rupture. Implementation of Measure DD would not expose people or structures to substantial risk associated with rupture of a known fault. This potential impact would be less than significant.

(1b) Strong Seismic Ground Shaking. All structures in the Bay Area could potentially be affected by ground shaking during an earthquake. The amount of ground shaking depends on the magnitude of the earthquake, the distance from the epicenter, and the type of earth materials in between. Violent to very violent (MMI IX-X) ground shaking is expected at the project site during expected earthquakes on the Hayward and other regional faults. This level of seismic shaking could cause extensive structural damage to buildings, trails and bridges of the project. Most older masonry and frame structures would likely be destroyed, window glass broken, underground pipes broken, and conspicuous cracks may appear in the ground, curbs and pavement. Nonstructural effects during and following the event may include difficulty or inability to stand, general panic, and temporary loss of utilities service.

Some project components include buildings to be occupied by humans for recreational uses, such as the Boathouse, Pavilion and restaurant; however no residential structures are proposed as part of Measure DD. The California Building Code designates the project area and vicinity as Zone 4, the highest risk category. All components of Measure DD requiring the issuance of Building Permits will be subject to the California Building Code and subject to the most stringent level of seismic safety engineering. Prior to the issuance of any site-specific grading or building permits, a design-level geotechnical investigation (Condition 48) would be required by the City and prepared by a licensed professional and submitted to the City of Oakland Building Services Center for review and

Table IV.I-2: Summary of Potential Impacts – Geology, Soils and Seismicity

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Expose people/structures				
a) to a known earthquake fault?	==	==	==	O
b) to seismic ground shaking?	O	O	O	O
c) to seismic-related ground failure?	O	O	O	O
d) to landslides?	==	==	==	O
2) Result in soil erosion?	See Section IV.H, Hydrology and Water Quality			
3) Be located on expansive soil?	O	O	O	O
4) Be located above a well, pit, swamp, mound, tank vault, or unmarked sewer line?	O	O	O	O
5) Be located above a landfill?	NA	NA	NA	NA
6) Be above to support septic tanks/alternative wastewater disposal systems.?	NA	NA	NA	NA

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
GEO-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

confirmation that the proposed development fully complies with the California Building Code (Seismic Zone 4). The report would determine the project site's geotechnical conditions and address potential seismic hazards, such as liquefaction. The report would identify building techniques appropriate to minimizing seismic damage. In addition, the geotechnical investigation must conform to the California Division of Mines and Geology (CDMG)[41] recommendations presented in the *Guidelines for Evaluating Seismic Hazards in California*, CDMG Special Publication 117. All earthquake and seismic shaking mitigation measures, design criteria, and specifications set forth in

[41] The California Division of Mines and Geology adopted the name California Geological Survey in 2002, however, older copies of this guide have the original organizational name.

the geotechnical and soils report will be followed during the design and construction of structures proposed under Measure DD. These criteria are required by the City's Standard Condition of Approval 48: Geotechnical Report.
It is acknowledged that seismic hazards associated with any development in the San Francisco Bay

Area cannot be completely eliminated even with site-specific geotechnical investigation and advanced building practices. Exposure to seismic hazards is a generally accepted part of living in the San Francisco Bay Area. However, this potential impact would be less than significant with implementation of the City's standard condition of approval is included as part of the project.

(1c) Seismic-related ground failure, including liquefaction, lateral spreading, subsidence, collapse. The components of the Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities groups are within a mapped liquefaction hazard zone based on the State of California Seismic Hazards Mapping Act. Development permits for sites within such a zone require a design-level geotechnical investigation, to be prepared by a licensed professional, and approved by the City of Oakland Building Services Department, to evaluate geologic and soil conditions of the project sites, and component design shall incorporate all appropriate mitigation measures, if any, into development plans, as described in Condition of Approval 48: Geotechnical Report, described above. Evaluation and mitigation of seismic hazards are to be conducted under guidelines adopted by the California State Mining and Geology Board (SMGB).[42] Inclusion of the recommended earth preparation, foundations systems and mitigation measures reduces the potential hazards associated with seismic related ground failure to a less-than-significant level.

(1d) Landslides. Only the City-wide Creeks group would have components located in areas of unstable soils potentially at risk for landslide hazard. The activities associated with these components would improve conditions related to soil and slope stability by the revegetation of riparian habitats, increasing permeability and decreasing runoff velocities by removing hardscaping, improving creek channel conditions, stabilizing banks, creek bed alignment and grading improvements, removal or repair of culverts and/or reestablishment of open creek channels. Components subject to the potential "creep" of unstable soils are addressed below as part of the discussion of settlement and differential settlement. This potential impact would be less than significant.

(2) Erosion. Potential impacts associated with erosion and loss of topsoil are discussed in the Hydrology and Water Quality section of this Draft EIR.

(3) Expansive Soils and Differential Settlement. Under the proposed Measure DD, many of the individual components would require that the surface materials be graded in preparation for improvements such as buildings, bridges, trails and roadways. Native soils may exhibit high shrink/swell characteristics in response to the amount of moisture present. Grading and excavation of the project site in preparation for construction of structures and utilities would result in areas of cut and fill. Engineered fill, existing non-engineered fill, and native undisturbed soil would be subject to varying rates of expansion, compaction and settlement. Structures built over discontinuous materials of varying densities and levels of compaction may be subject to stress or damage due to differential settlement. Structures built on Urban Land or Bay Mud may be subject to differential settlement or

[42] California Geological Survey, 2003, op. cit.

failures of underlying layers, particularly if the structural loads are unevenly distributed across the site, or if the site is sloped, or adjacent to a shoreline. In the event an open face, such as a shoreline or ditch is present, or unstable soils underlie a slope, new loads could trigger "creep" whereby the earth slumps relatively slowly towards the unconfined space. Structural damage, warping, and cracking of pavements and other infrastructure, and rupture of utility lines may occur if potentially expansive/unstable soils were not considered during design and construction of improvements.

With the exception of some of the City-wide Creeks group components (which are relatively small in scale and would not include extensive earthworks) and the existing structures of the Studio One Art Center, the components of Measure DD, in complying with the State of California Seismic Hazards Mapping Act and/or the City of Oakland's Grading Ordinance, will require a design-level geotechnical investigation. These investigations will be prepared by a licensed professional and approved by the City of Oakland Building Services Department and will evaluate geologic and soil conditions of the project sites as required by Standard Condition of Approval 48: Geotechnical Report, described above. Mitigation measures, design criteria, and specifications set forth in the design-level geotechnical investigation will be followed and incorporated into the project to reduce impacts associated with shrink-swell soils and settlement to a less-than-significant level.

(4) Well, pit, swamp, mound, tank vault, or unmarked sewer line. The current uses of component sites are well documented. In some areas, such as the 12th and 10th Street bridges, extensive grading and removal of old vaults and culverts are an integral part of the improvement project. The various components of the four groups of the Measure DD project are being developed by the City of Oakland and under guidance and planning resulting from engineering studies and multiple environmental investigations. There is no indication of wells, pits, swamps, mounds, tanks vaults or unmarked sewer lines at any of the other component sites. Should these hazards be discovered during grading or construction of any component, the City's Grading Permit requirements and Standard Conditions of Approval 24 and 43 would reduce this impact to a less-than-significant level. Any abandoned structures discovered during excavation will be fully removed and/or engineered fill will be introduced to eliminate any subsurface voids. This potential impact would be less than significant because the City's condition of approval is included as part of the project.

(5) Be located above landfills for which there is no approved closure and post-closure plan, or unknown fill soils, creating substantial risks to life or property. There are no landfill operations at or near any Measure DD components. Review of the California Department of Toxic Substances Envirostor Website[43] does not indicate any landfill sites under closure proceedings in the area of any project components. Unknown fill soils are addressed above as part of the discussion of settlement and differential settlement. There would be no impact associated with this criterion for any project group.

(6) Soils Incapable of Adequately Supporting the use of Septic Tanks. The proposed project is located within the City of Oakland and will use city services for potable water delivery and wastewater disposal; septic systems are not proposed. None of the project components call for the installation or use of alternative wastewater disposal systems. There would be no impact associated with this criterion for any project group.

[43] California Department of Toxic Substances, 2007, Envirostor Mapping Tool, accessed 2-15-07 at www.envirostor.dtsc.ca.gov/public/

J. HAZARDS AND HAZARDOUS MATERIALS

This section describes the existing setting for hazards and hazardous materials and evaluates the effects of the proposed Measure DD Implementation Project components related to exposure to hazardous materials[1] in contaminated soil, soil gas, groundwater, and building materials. Potential public health and safety impacts that may result from project implementation are described, and mitigation measures to reduce identified impacts to a less-than-significant level are included, as appropriate.

1. Setting

This section presents the hazardous materials setting for the Measure DD Implementation Project, including previous environmental investigations completed within various project components. The regulatory framework for hazardous materials and hazardous waste, hazardous building materials, and applicable worker health and safety requirements are also described.

a. Methods. This hazards and hazardous materials evaluation was based on a review of available information included with the applications, review of environmental investigation reports and other published materials for the Measure DD Implementation Project, interviews with regulatory agency personnel, and site reconnaissance.

b. Existing Conditions. Proposed project activities that could potentially expose humans to hazards and hazardous materials are described below. Environmental investigations and historical land use information completed for specific components within each project group are also summarized.

(1) Lake Merritt and Lake Merritt Channel (Group 1). The northern portion of the Lake Merritt Channel and the roadways surrounding Lake Merritt, specifically the area around 12th Street, was historically marsh that was reclaimed with fill material in the early 1900s. Additional fill was added during the 1950s when the streets were built in their current configuration.[2] The source of the material is unknown. The fill material may contain metals above ambient concentrations or other hazardous materials. Many properties surrounding the Lake Merritt Channel have been used for past industrial activities that could have contributed to soil and/or groundwater contamination with metals, polychlorinated biphenyls (PCBs), petroleum hydrocarbons, and semi-volatile organic compounds (SVOCs).[3] Aerially-deposited lead from historical use of leaded gasoline may have affected shallow soils along roadways, and petroleum hydrocarbons, lead, and other heavy metals from railroad tracks and operations (near the southern portion of the Lake Merritt Channel improvements) are potential contaminants of concern for this

[1] The California Health and Safety Code defines a hazardous material as, "...any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment." (California Health and Safety Code Section 25501).

[2] Baseline Environmental Consulting, 2004, Phase I Environmental Site Assessment, 12th Street Reconstruction Project, prepared for Public Affairs Management, August.

[3] URS, 2002, Feasibility Study and Greenbelt Plan for the Lake Merritt Channel, Oakland, California, prepared for the Port of Oakland, 24 June.

group.[4] The presence of contaminated soil and/or groundwater in project construction areas could require special treatment, handling, and off-site disposal of excavated materials and could impact worker health and safety and nearby receptors during proposed construction activities.

Environmental investigations have been completed at several sites within the Lake Merritt and Lake Merritt Channel group, specifically the 12th Street area, Lakeshore Avenue, Lake Merritt Municipal Boathouse, and Lake Merritt Channel. In addition, a regulatory agency database review was completed for some locations within and immediately adjacent to the group area including Lake Merritt and the northern portion of Lake Merritt Channel.[5] Reviews of regulatory agency information for project components and nearby sites did not identify any hazardous materials releases at or adjacent to the project groups that are under active regulatory oversight. Reported release cases at 101 Lakeside Drive, 300 Lakeside Drive, 1310 Oak Street, 1200 Lakeshore Avenue, 1225 Fallon Street (Alameda County Courthouse), and 900 Fallon Street (Laney College) have been closed indicating that remediation is complete or was not necessary.[6]

12th Street Reconstruction. A Phase I Environmental Site Assessment (ESA) for the 12th Street project area, including the northern portion of the proposed Lake Merritt Channel and Peralta Park, concluded that fill of unknown origin was placed in this area and may have contained contaminants such as metals.[7] In addition, soils and/or groundwater could have been contaminated with organic compounds from historical adjacent land uses. An investigation of the fill in the channel and shallow soils (for aerially-deposited lead) was recommended to determine if contaminants in soil would present a health risk to construction workers and/or require that the soils be managed as a hazardous waste, once excavated.

A Phase II investigation was completed in November 2004 to selectively analyze fill, sediment, and shallow soil samples for contaminants of concern within proximity to the 12th Street improvements.[8] All but one of the samples collected were within the proposed project area. None of the fill or sediment samples contained metals or organic compounds above the San Francisco Regional Water Quality Control Board's (Water Board) Environmental Screening Levels (ESLs) for construction/trench workers.[9] However, three shallow soil samples within the 12th Street project area contained soluble lead above California hazardous waste thresholds.[10] The Phase II report recommended additional sampling to evaluate total and soluble lead near project area roadways, once the areas and depths and grading for the project were known.

[4] Ibid.

[5] Environmental Data Resources, Inc (EDR). 2006, The EDR Radius Map with GeoCheck, Baseline Environmental Consulting, 2004, op. cit.

[6] Ibid.

[7] Baseline Environmental Consulting, 2004, op cit.

[8] Baseline Environmental Consulting, 2005, Phase II Environmental Site Assessment, Twelfth Street Reconstruction Project, Oakland, California, 7 January.

[9] The Water Board has developed ESLs to help expedite the preparation of environmental risk assessments at sites where impacted soil and groundwater has been identified. Data collected at a site can be directly compared to ESLs and the need for additional work evaluated. ESLs are described in further detail in the regulatory section below.

[10] Wastes with total or soluble metals that equal or exceed threshold quantities as defined in Title 22, California Code of Regulations (CCR), Section 66261.24 are considered California (or non-RCRA) hazardous wastes. See the regulatory agency section for additional discussion of California and Federal hazardous waste thresholds.

An investigation for aerially-deposited lead was completed in February 2006.[11] Thirty soil samples were collected near roadways at the 12th Street project component and northern portion of the Lake Merritt Channel improvements to evaluate whether aerially-deposited lead may affect site construction workers. Statistical analysis of the data from the soil samples collected indicated that the concentration of total lead was below California hazardous waste thresholds and ESLs for construction workers. Soluble lead concentrations, however, were above California hazardous waste thresholds and excavated soil may therefore constitute a California hazardous waste, once excavated.

Lakeshore Avenue. In 2005, five surface soil samples were collected between Lakeshore Avenue and the northeast to eastern bank of Lake Merritt in the Lakeshore Avenue project area.[12] Concentrations of total lead for all five samples were below ESLs for residential land uses, commercial/industrial uses, and construction/trench worker direct contact. The concentrations were also substantially below California hazardous waste thresholds for total lead.

Lake Merritt Municipal Boathouse. Asbestos and lead abatement work and interior demolition activities have been completed at the Boathouse[13] and the main renovation was underway as of the date of the preparation of this section.[14] The Boathouse dates back to 1908, and was originally used as a pumping station, prior to being remodeled and used as a boathouse.[15]

Lake Merritt Channel. A hazardous materials study has been completed for the Lake Merritt Channel and properties within one-quarter mile of the Channel.[16] The study included a regulatory records search, field inspections, and review of historical information sources. No soil sampling was performed. Several sites and issues of environmental concern were identified. These included: 1) commercial development around the Channel with hazardous materials uses; 2) railroad bridges over the Channel constructed prior to 1915, which may be associated with petroleum hydrocarbon, lead, and/or other heavy metal contamination; 3) asbestos and/or lead-based paint that may have been used during the construction and maintenance of bridges over the Channel; 4) aerially-deposited lead from vehicle emissions; 5) petroleum pipelines adjacent to the southern railroad bridge; and 6) staining identified on the ground at the east side of the Channel beneath the I-880 bridge.

(2) Waterfront Trail (Group 2). The waterfront area where the Waterfront Trail is proposed for construction is underlain by artificial fill materials, alluvium, and Bay Mud

[11] Baseline Environmental Consulting, 2006, Aerially-Deposited Lead Investigation, Twelfth Street Reconstruction Project, Oakland, California, prepared for Circle Point, February.

[12] Kleinfelder, 2005, Table 1, Soil Samples-Lead, Lakeshore Avenue, City of Oakland, Site Vicinity Map (Plate 1), and Soil Sample Locations (Plate 2), and analytical results.

[13] The asbestos/lead-based paint abatement was documented by SCA Environmental, 2005, Hazardous Materials Abatement Specifications, 10 June 2005; and SCA Environmental, 2005, Final Report on Asbestos and Lead Hazard Abatement Activities, Volume 1 and 2 for 1520 Lakeside Drive, Oakland, 20 June. These documents were referenced in Measure DD Series 2003 A, 2007, op cit. but were not available for review for the Draft EIR analysis.

[14] Measure DD Series 2003A, 2007, op. cit.

[15] Preservation Architecture, 2004, Lake Merritt Municipal Boathouse, Historic Structures Report, prepared for Murakami/Nelson, 13 October.

[16] URS, 2002, op. cit.

deposits.[17] The source of this fill is unknown, and may potentially contain metals above ambient concentrations, petroleum hydrocarbons, and other hazardous materials. At some locations, the proposed trail is located near major roadways (e.g., Embarcadero, Nimitz Freeway) and railroad tracks (near the southern portion of the Lake Merritt Channel improvements), which may have contributed to shallow soil contamination within the proposed trail area. At other locations, the proposed trail is near or on industrial/commercial properties (e.g., Gallagher & Burke/Hanson Aggregates, US Audio/Capture Technologies), which may use hazardous materials.

Environmental investigations have been completed for several sites within the area proposed for the Waterfront Trail group, specifically Estuary Park, Brooklyn Basin, the Cryer/Steam Valve Site, and 66th Avenue Gateway (including Lancaster Street, Derby Street, and Alameda Avenue). The results of these investigations are described below.

Estuary Park. Proposed improvements at Estuary Park include the trail, park landscaping, parking, and water access. The adjacent Cash and Carry Warehouse site may also be incorporated into the park. However, the demolition and/or development of the Cash and Carry Warehouse site is the obligation of the Oak to Ninth Avenue Project approved in July 2006. The Oak to Ninth Avenue Project Draft EIR included mitigation measures requiring development of a cleanup plan for this location.[18] The Oakland City Council approved the project on July 18, 2006 which included cleanup of Estuary Park as preparation for park improvement.[19] The findings and recommendations of investigations completed at this site were incorporated into the impacts analysis included in this Draft EIR. The Cash and Carry Warehouse site would be incorporated into the park after the any required remediation and/or development are complete.

Brooklyn Basin. A Pre-Construction Sampling Report was prepared for the Brooklyn Basin property, in anticipation of the Oakland Waterfront Trail construction.[20] The purpose of the report was to assess potential risks to construction workers and to provide a preliminary waste profiling, should the construction activities require transport or disposal of soils. Concentrations of petroleum hydrocarbons in soils and groundwater were identified at concentrations above the ESLs in isolated locations. Arsenic, total chromium, and total lead were reported in soil above the ESLs or background levels. Some lead results were also in excess of Federal and State hazardous waste criteria in the samples collected and would be classified as a hazardous waste, once excavated. Total chromium results for two samples collected exceeded ten times the California threshold limit concentration and could also potentially constitute a State hazardous waste.[21]

Cryer/Steam Valve Site. The Oakland Waterfront Trail would cross the site. Other improvements would include a park area, parking, beach restoration, pier replacement, and potentially converting the building at the Steam Valve site for community use. The Cryer Site was used as a boatworks and boat repair site for approximately 60 years. A Phase I ESA was

[17] Ninyo & Moore, 2004, Geotechnical Evaluation, 66th Avenue Gateway Project, Oakland, California, Prepared for DKS Associates, 14 April; Kleinfelder, 2006b, Geotechnical Study, Proposed Cryer Site Park, Embarcadero and Dennison Street, Oakland, California, 11 January.

[18] Environmental Science Associates (ESA), 2005,op cit.

[19] Measure DD Series 2003, 2007, op. cit.

[20] Cambria, 2004b, Letter to Mr. G. Nair, City of Oakland Public Works Agency, Environmental Services Division, Re: Pre-Construction Sampling Report, Brooklyn Basin Property, Embarcadero Way, 16 August.

[21] Analysis for soluble chromium was not completed. Ibid.

performed for the site in 1995 and a limited soil and groundwater investigation was completed for the site and the adjoining Steam Valve site in 1998 and 2000.[22] [23] A Pre-Construction Sampling Report was prepared in 2004,[24] and a subsurface investigation was performed and a soil remediation plan was prepared in 2005-2006.

All buildings associated with the Cryer Site have been demolished and the site has been graded.[25] The building remaining at the Steam Valve Site is being considered under the proposed project for either demolition or renovation.[26] Based on the results of the various site investigations, the following contaminants of concern are associated with this site: metallic slag,[27] soil contaminated with slag, and soil contaminated with petroleum hydrocarbons and metals.[28] A revised Corrective Action Plan (CAP) was submitted to the Water Board in January 2006.[29] A Final CAP was prepared in March 2007 to address comments on the revised CAP and include agreements reached between the City of Oakland and RWQCB.[30] The Final CAP proposes excavating approximately 3,250 cubic in-place yards of slag and contaminated soil and capping the site with clean soil and/or concrete design elements where some slag materials may remain on-site to prevent exposure. Excavated materials would be transported off site for disposal at a permitted facility. The Final CAP has been approved by the RWQCB.[31]

66th Avenue Gateway, Lancaster Street, Derby Street and Alameda Avenue. A Pre-Construction Soil Investigation Report for the 66th Avenue Gateway was prepared in 2004. The investigation included the area west of Lancaster Street, west of Derby Street, and Alameda

[22] The Phase I was cited in Kleinfelder, 2006a op cit., but was not available for review for this Draft EIR analysis.

[23] These investigations were cited in Kleinfelder, 2006a, op. cit. but were not available for review for this Draft EIR analysis.

[24] Cambria, 2004a, Letter report for G. Nair, City of Oakland Public Works Agency, Re: Pre-Construction Sampling Report, Former Cryer Boatyard, Embarcadero and Dennison Street, Oakland, California, 16 August.

[25] Kleinfelder, 2006a, op. cit.. Asbestos and lead abatement was completed prior to demolition by SCA in 2005. SCA, 2005, Final Report: Asbestos and Lead Hazard Abatement Activities, Cryer Boatyard, 1899 Dennison Street and Embarcadero, Oakland, California, prepared for the City of Oakland Public Works Agency, Environmental Services Division, 7 September.

[26] Asbestos and lead-based paint surveys were not identified for this building in the documents reviewed

[27] Slag is a product of smelting ore to purify metals; based on the results of the investigations, slag was deposited on the ground outside the former metal smith building. Wolfe Mason Associates, 2005, Letter from J. Hykes, to M. Levenson, Bay Conservation and Development Corporation Re: Cryer Site Park Design Review Submittal, 11 November.

[28] Kleinfelder, 2006a. op. cit.

[29] Ibid; Kleinfelder, 2006b, Letter to G. Nair, City of Oakland Public Works Agency, Environmental Services Division, Re: Evaluation of Possible Remedial Alternatives and Costs for the Former Cryer Boatyard Property, Oakland Waterfront Trail Project, Oakland, California, 23 May; Kleinfelder, 2006b, Letter to G. Nair, City of Oakland Public Works Agency, Environmental Services Division, Re: Evaluation of Possible Remedial Alternatives and Costs for the Former Cryer Boatyard Property, Oakland Waterfront Trail Project, Oakland, California, 23 May.

[30] Kleinfelder, 2007, Final Corrective Action Plan, Former Cryer Boat Yard and Steam Valve Property, Embarcadero and Dennison Street, Oakland, California, prepared for City of Oakland Public Works Agency, Environmental Services Division, 28 March.

[31] Peter, Joel, City of Oakland, 2007, Electronic correspondence to D. Brown, LSA regarding Revised CAP for Cryer Site, 11 July.

Avenue,[32] near the proposed location of the Oakland Waterfront Trail. Surface and shallow subsurface soil samples and one groundwater sample were collected during the investigation and laboratory results were compared to Water Board ESLs for residential and commercial/industrial land uses. Metals soil data were also compared to naturally-occurring metals concentrations and Federal and State hazardous waste threshold concentrations.

The investigation concluded that: 1) the locations where petroleum hydrocarbons and metals were detected at concentrations at or in excess of the ESLs appear to be small, isolated areas; 2) arsenic, total chromium and lead were detected in surface soil at levels in excess of regulatory agency action levels or background levels, and are therefore of potential concern; and 3) no metal was detected at a concentration that would characterize it as California hazardous waste based on total concentration, though additional characterization would be required to evaluate soluble metals concentrations.

(3) Recreational Facilities (Group 3). Reconstruction work at the Studio One Art Center has included asbestos and lead-based paint abatement.[33] The site was not listed on the Cortese list of hazardous materials release sites maintained by regulatory agencies.[34] The site was, however, listed on the State HAZNET database of hazardous waste generators for off-site shipment of photoprocessing/photochemical waste, waste organics, and waste inorganics, possibly generated during routine operation of the art studio, or from abatement activities. Waste asbestos was also identified as being shipped off-site from this location (likely from the abatement activities above).

The proposed site of the East Oakland Sports Complex at Ira Jinkins Recreation Center was not listed on the Cortese list of hazardous materials releases sites maintained by regulatory agencies.[35] However, the location was listed on the Formerly Used Defense Sites (FUDS) database of properties where the U.S. Army Corps of Engineers is actively working or will take necessary cleanup actions.[36] The listing under FUDS indicated that "no potential hazardous [wastes] were identified at the site." Other historical uses of this site, which may have the potential for hazardous materials uses, could not be determined from review of available historical map resources.[37]

[32] Cambria, 2004c, Pre-Construction Soil Investigation Report, Alameda Avenue, Derby Street, Lancaster Street, and 66th Street, prepared for G. Nair, City of Oakland, Environmental Services Division, 28 July.

[33] Measure DD Series 2003 A, 2007, op cit. Asbestos and lead-based paint surveys and remediation documentation were not identified for review.

[34] Environmental Data Resources, Inc., 2007a, The EDR Radius Map Report, Studio One, 265 45th Street, Oakland, CA 94609, Inquiry No. 1856918.3s, 14 February. The Cortese database, maintained by the California Environmental Protection Agency, Office of Emergency Information, identifies public drinking water wells with detectable levels of contamination, hazardous substances sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with underground storage tanks having a reportable release and all solid waste disposal facilities from which there is known migration.

[35] Environmental Data Resources, Inc., 2007b, The EDR Radius Map Report, Proposed East Oakland Recreational Facility, 9175 Edes Avenue, Oakland, Inquiry No. 1856918.1s, 14 February.

[36] The listing indicated that this was the Oakland Municipal Airport Detachment Housing Site. The U.S. Government acquired the property in 1943. EDR, 2007b, op. cit.

[37] There is no Sanborn map coverage for this site. EDR, 2007c, Sanborn Map Report, Proposed East Oakland Recreational, 9175 Edes Avenue, Oakland, California, 15 February.

(4) City-wide Creeks (Group 4). No previous environmental investigations for the proposed creek restoration sites within Oakland were available for this Draft EIR analysis. Restoration activities could include activities that disturb soil, surface water, and/or groundwater, and could therefore potentially release hazardous materials, if present. The activities could include: demolition of existing hardscape; realignment of utilities; grading, clearing and grubbing of existing landscaping areas; removal of undesireable plants; creek bed grading, refurbishment, or alignment; culvert repair and replacement; toe and slope stabilization activities; in-stream improvements (including daylighting creeks); and irrigation and access improvements.[38] The off-site transport and disposal of excavated soil and/or disposal of dewatered groundwater may be required and would be subject to State and federal regulatory agency requirements.

c. Regulatory Context. The following section provides the federal, State, and local regulatory framework for hazardous materials and waste, building materials (e.g., lead, asbestos), and worker health and safety.

(1) Hazardous Materials and Hazardous Waste. The use, storage, and disposal of hazardous materials, including management of contaminated soils and groundwater, is regulated by numerous local, state, and federal laws and regulations. The U.S. Environmental Protection Agency (U.S. EPA) is the federal agency that administers hazardous materials and hazardous waste regulations. State agencies include the California EPA (Cal/EPA), which includes the California Department of Toxic Substances Control (DTSC), the State Water Resources Control Board (State Water Board), the California Air Resources Board (CARB), and other agencies. The San Francisco Bay Regional Water Quality Control Board (Water Board), the Bay Area Air Quality Management District (BAAQMD), Alameda County Department of Environmental Health (ACDEH), and Oakland Fire Services Agency (OFSA) have jurisdiction on a regional or local level.

A description of each agency jurisdiction and involvement in the management of hazardous materials and wastes is provided below.

Federal. The U.S. EPA is the federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials and hazardous waste. The federal regulations are primarily codified in Title 40 of the Code of Federal Regulations (40 CFR). The legislation includes the Resource Conservation and Recovery Act of 1976 (RCRA), the Superfund Amendments and Reauthorization Acts of 1986 (SARA), and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The U.S. EPA provides oversight for site investigation and remediation projects, and has developed land disposal restrictions and treatment standards for the disposal of certain hazardous wastes.

State. Three State agencies, described below, regulate hazardous materials and waste applicable to the proposed project.

Department of Toxic Substances Control. In California, DTSC is authorized by U.S. EPA to enforce and implement federal hazardous materials laws and regulations. California regulations

[38] City of Oakland Public Works, Environmental Sciences Division, Creek Restoration Program and Acquisition Activities Description, not dated.

pertaining to hazardous materials are equal to or exceed the federal regulation requirements. Most State hazardous materials regulations are contained in Title 22 of the California Code of Regulations (CCR). DTSC generally acts as the lead agency for soil and groundwater cleanup projects that affect public health, and establishes cleanup levels for subsurface contamination that are equal to, or more restrictive than, federal levels. DTSC has also developed land disposal restrictions and treatment standards for hazardous waste disposal in California.

State Water Resources Control Board. The State Water Board enforces regulations on how to implement underground storage tank (UST) programs. It also allocates monies to eligible parties who request reimbursement of funds to clean up soil and groundwater pollution from UST leaks. State Water Board also enforces the Porter-Cologne Water Quality Act through its nine regional boards, including the San Francisco Bay Regional Water Board, described below.

California Air Resources Board. This agency is responsible for coordination and oversight of State and local air pollution control programs in California, including implementation of the California Clean Air Act of 1988. CARB has developed State air quality standards, and is responsible for monitoring air quality in conjunction with the local air districts.

Regional and Local Agencies. The following regional and local agencies have regulatory authority over the proposed project's management of hazardous materials and waste on the site.

San Francisco Bay Regional Water Quality Control Board. The project site is located within the jurisdiction of the San Francisco Bay Water Board. The Water Board provides for protection of State waters in accordance with the Porter-Cologne Water Quality Act of 1969. The Water Board can act as lead agency to provide oversight for sites where the quality of groundwater or surface waters is threatened, and has the authority to require investigations and remedial actions.

The Water Board has developed Environmental Screening Levels (ESLs)[39] to help expedite the preparation of environmental risk assessments at sites where impacted soil and groundwater has been identified. Data collected at a site can be directly compared to ESLs and the need for additional work evaluated.

Bay Area Air Quality Management District. The BAAQMD has primary responsibility for control of air pollution from sources other than motor vehicles and consumer products (which is the responsibility of U.S. EPA and CARB). BAAQMD is responsible for preparing attainment plans for non-attainment criteria pollutants, control of stationary sources, and the issuing of permits for activities including asbestos demolition/renovation activities (District Regulation 11, Rule 2).

Alameda County Department of Environmental Health and Oakland Fire Services Agency. ACDEH and OFSA are the primary agencies responsible for local enforcement of State and federal laws pertaining to hazardous materials management and for oversight of hazardous materials investigations and remediation in Alameda County.

[39] San Francisco Regional Water Quality Control Board (Water Board), 2007. Website: http://www.waterboards.ca.gov/sanfranciscobay/esl.htm

In Oakland, OFSA has been granted responsibility for implementation and enforcement of many hazardous materials regulations at the project site under the Certified Unified Program Agency (CUPA) Program (California Health and Safety Code Chapter 6.11). The CUPA programs include coordination of the local hazardous waste generator program, underground and aboveground storage tank management, and investigation of leaking underground storage tank sites. OFSA also implements the City of Oakland Hazardous Materials Assessment and Reporting Program, pursuant to City Ordinance No. 12323, which requires notification of hazardous materials storage, use and handling, and an assessment as to whether this storage, use and handling would cause a public health hazard to nearby sensitive receptors including schools, hospitals or other sensitive receptors.

The Oakland Office of Emergency Services (part of OFSA), provides emergency response to fire emergencies and hazardous materials incidents within the City of Oakland, and conducts vegetation management inspections for wildfire reduction. Oakland has entered into agreements with adjoining jurisdictions for cooperative response to fires.[40]

Urban Land Redevelopment (ULR) Program. The ULR program is a collaborative effort by the City of Oakland and the principal agencies charged with enforcing environmental regulations (DTSC, Water Board, and ACDEH) to facilitate the cleanup and redevelopment of contaminated properties in Oakland. The program is coordinated by the City and specific to Oakland sites. The ULR Program clarifies environmental investigation requirements, and establishes Oakland-specific, risk-based corrective action (RBCA) standards for qualifying sites. RBCA standards are criteria that, when met, adequately address risk posed by contamination to human health. The RBCA standards were first submitted in 1999, and are planned for revision this year.[41]

(2) Lead, Asbestos, and Other Hazardous Building Materials. Prior to 1978, lead compounds were commonly used in exterior and interior paints. Lead is a suspected human carcinogen (i.e., causes cancer), a known teratogen, and a reproductive toxin (i.e., causes birth defects and sterility). Prior to the 1980s, building materials often contained asbestos fibers, also a known human carcinogen. Asbestos, used to provide strength and fire resistance, was frequently found in insulation, roofing, and siding, textured paint and patching compounds used on wall and ceiling joints, vinyl floor tiles and adhesives, and water and steam pipes, among other uses.

Demolition or renovation of structures constructed prior to 1980 has the potential to release lead particles, asbestos fibers, and/or other hazardous materials to the air, which then may be inhaled by construction workers and the general public. In addition, other common items, such as electrical transformers, fluorescent lighting, electrical switches, heating/cooling equipment, and thermostats can contain hazardous materials, such as PCBs or mercury (described in further detail below), which may pose a risk if not handled and disposed of properly.

Federal and State regulations govern the demolition of structures where lead or material containing lead is present. Regulations pertaining to demolition of structures with lead-based paint are promulgated by the U.S. EPA, DTSC, and the U.S. Department of Housing and Urban

[40] City of Oakland, General Plan, Safety Element, Fire Hazards (Chapter 4), November 2004, http://www.oaklandet.com, information reviewed on 12 February 2007.

[41] Mark Gomez, City of Oakland Public Works Agency, Environmental Services Division, personal communication with J. Pettijohn of Baseline, January 2007.

Development (HUD). For example, the U.S. EPA and DTSC require that lead-based paint equal to or greater than the HUD definition of lead-based paints (greater or equal to 1 mg/cm^2 or 0.5 percent lead by weight) be removed prior to demolition if the paint is loose and peeling. Loose and peeling paint must be disposed of as a State and/or federal hazardous waste if the concentration of lead exceeds applicable waste thresholds. State and federal construction worker health and safety regulations, described below, require air monitoring and other protective measures during demolition activities where lead-based paint is present.

Federal, State, and local requirements also govern the removal of asbestos or suspected asbestos-containing materials (ACM), including the demolition of structures where asbestos is present. These requirements are promulgated by the U.S. EPA, federal and state Occupational Safety and Health Administration (OSHA), DTSC, and the BAAQMD. All friable (crushable by hand) ACMs, or non-friable ACMs subject to damage, must be abated prior to demolition in accordance with applicable requirements. Friable ACM must be disposed of as an asbestos waste at an approved facility. Non-friable ACM may be disposed of as non-hazardous waste at landfills that will accept such wastes. Workers conducting asbestos abatement must be trained in accordance with State and federal OSHA requirements, described below.

PCBs have been used as coolants and lubricants in transformers, capacitors, heating/cooling equipment, and other electrical equipment that may be present in buildings that would be demolished or renovated under the proposed project. PCBs have not been manufactured in the United States since 1977, but may still be found in older electrical equipment and other building materials like light ballasts. PCBs have been associated with acne-like skin conditions in adults and changes in the nervous and immune system in children. PCBs are also known to cause cancer in laboratory animals and are probable human carcinogens.[42] PCB or PCB-contaminated items require proper off-site transport and disposal at a facility that can accept such wastes.

Fluorescent lighting tubes and ballasts, computer displays, and several other common items containing hazardous materials (including mercury, a heavy metal) are regulated as "universal wastes" by the State of California. Universal waste regulations allow common, low-hazard wastes to be managed under less stringent requirements than other hazardous wastes. Management of other hazardous wastes is governed by DTSC hazardous waste rules.

(3) Worker Health and Safety. Worker health and safety is regulated at the federal level by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). The Federal Occupational Safety and Health Act of 1970 authorizes states (including California) to establish their own safety and health programs with OSHA approval; implementation of worker health and safety in California is regulated by the California Department of Industrial Relations (DIR). The DIR includes the Division of Occupational Safety and Health (DOSH), which acts to protect workers from safety hazards through its California OSHA (Cal/OSHA) program and provides consultative assistance to employers. California standards for workers dealing with hazardous materials are contained in CCR Title 8 and include practices for all industries (General Industrial Safety Orders), and specific practices for construction, and other industries. Workers at hazardous waste sites (or working with hazardous wastes as might be encountered during excavation of contaminated soils) must receive specialized training and

[42] Agency for Toxic Substances and Disease Registry, 2001, Tox FAQs for Polychlorinated Biphenyls (PCBs), February, http://www.atsdr.cdc.gov, information reviewed on 18 April 2007.

medical supervision according to the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations.[43] Additional regulations have been developed for construction workers potentially exposed to lead[44] and asbestos.[45] Cal/OSHA enforcement units conduct on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

Worker health and safety in California is regulated by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA). California standards for workers dealing with hazardous materials (including hazardous wastes, asbestos, and lead) are contained in CCR Title 8 and include practices for all industries (General Industrial Safety Orders), and specific practices for construction, hazardous waste operation and emergency response. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

d. City of Oakland Policies. The November 2004 Safety Element of the Oakland General Plan[46] contains the following policies regarding hazards and hazardous materials and emergency response that may apply to this project. Relevant policies from other General Plan elements are also described.

- Policy HM-1: Minimize the potential risks to human and environmental health and safety associated with past and present use, handling, storage and disposal of hazardous materials.
- Policy HM-2: Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.
- Policy HM-3: Seek to prevent industrial and transportation accidents involving hazardous materials and enhance the city's capabilities to response to such incidents.
- Policy PS-1: Maintain and enhance the city's capacity to prepare for, mitigate, respond to, and recover from disasters and emergencies.

The following policy statements from the Open Space, Conservation and Recreation (OSCAR) Element of the General Plan[47] regarding hazards and hazardous materials may apply to the proposed project:

- Policy CO-1.2: Soil contamination and hazards. Minimize hazards associated with soil contamination through the appropriate storage and disposal of toxic substances, monitoring of dredging activities, and clean up of contaminated sites. In this regard, require soil testing for development of any site (or dedication of any parkland or community garden) where contamination is suspected due to prior activities on the site.
- Policy REC-4.2: Encourage maintenance practices which conserve energy and water, promote recycling, and minimize harmful side effects on the environment. Ensure that any application of chemical pesticides and herbicides is managed to avoid pollution of ground and surface waters.

The following statement from the Estuary Plan Element[48] of the General Plan regarding hazardous materials may apply to the proposed project.

[43] Title 8, CCR Section 5192.

[44] Title 8, CCR Section 1532.1.

[45] Title 8, CCR Section 1529.

[46] City of Oakland, General Plan, Safety Element, Hazardous Materials (Chapter 5), November 2004, http://www.oaklandnet.com, information reviewed on 12 February 2007.

[47] City of Oakland, General Plan, Safety Element, Appendix A, November 2004, information reviewed on-line http://www.oaklandnet.com, information reviewed on-line, 12 February 2007.

- Policy OAK-1.3: Undertake remediation of contaminants in conjunction with development and or improvement of relevant sites.

e. City of Oakland Municipal Code. The City of Oakland Municipal Code includes regulations for the handling of hazardous materials in the City. Title 8, Chapter 8.12 of the Oakland Municipal Code adopts California Health and Safety Code laws (Health and Safety Code Section 25500 et seq) related to hazardous materials. City Ordinance No. 12323 regarding hazardous materials reporting is described above.

f. City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential hazards and hazardous materials impacts would be reduced.

Condition 25: Hazards Best Management Practices. *Prior to issuance of a demolition, grading, or building permit.* The project applicant and construction contractor shall ensure that construction best management practices are implemented as part of construction to minimize the potential negative effects to groundwater and soils. These shall include the following:

a) Follow manufacture's recommendations on use, storage, and disposal of chemical products used in construction;

b) Avoid overtopping construction equipment fuel gas tanks;

c) During routine maintenance of construction equipment, properly contain and remove grease and oils;

d) Properly dispose of discarded containers of fuels and other chemicals.

e) Ensure that construction would not have a significant impact on the environment or pose a substantial health risk to construction workers and the occupants of the proposed development. Soil sampling and chemical analyses of samples shall be performed to determine the extent of potential contamination beneath all UST's, elevator shafts, clarifiers, and subsurface hydraulic lifts when on-site demolition, or construction activities would potentially affect a particular development or building.

f) If soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), the applicant shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and the applicant shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of regulatory agency(ies) and implementation of the actions described in Standard Conditions of Approval 50 and 52, as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the City or regulatory agency, as appropriate.

Condition 29: Asbestos Removal in Structures. *Prior to issuance of a demolition permit.* If asbestos is found to be present in building materials to be removed, demolition and disposal is required to be conducted in accordance with procedures specified by Regulation 11, Rule 2 (Asbestos Demolition, Renovation and Manufacturing) of Bay Area Air Quality Management District (BAAQMD) regulations, as may be amended.

Condition 50: Phase I and/or Phase II Reports. *Prior to issuance of a demolition, grading, or building permit.* Prior to issuance of demolition, grading, or building permits the project applicant shall submit to the Fire Prevention Bureau, Hazardous Materials Unit, a Phase I environmental site assessment report, and a Phase II report if warranted by the Phase I report for the project site. The reports shall make recommendations for remedial action, if appropriate, and should be signed by a Registered Environmental Assessor, Professional Geologist, or Professional Engineer.

[48]City of Oakland General Plan, Estuary Policy Plan, information reviewed on-line http://www.portofoakland.com/realesta/reso_05.asp, adopted June 1999.

Condition 51: Lead-Based Paint/Coatings, Asbestos, or PCB Occurrence Assessment. *Prior to issuance of a demolition, grading, or building permit.* The project applicant shall submit a comprehensive assessment report, signed by a qualified environmental professional, documenting the presence or lack thereof of asbestos-containing materials (ACM), lead-based paint, and any other building materials or stored materials classified as hazardous waste by State or federal law.

Condition 52: Environmental Site Assessment Reports Remediation. *Prior to issuance of a demolition, grading, or building permit.* If the environmental site assessment reports recommend remedial action, the project applicant shall:

a) Consult with the appropriate local, State, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

b) Obtain and submit written evidence of approval for any remedial action if required by a local, State, or federal environmental regulatory agency.

c) Submit a copy of all applicable documentation required by local, State, and federal environmental regulatory agencies, including but not limited to: permit applications, Phase I and II environmental site assessments, human health and ecological risk assessments, remedial action plans, risk management plans, soil management plans, and groundwater management plans.

Condition 53: Lead-based Paint Remediation. *Prior to issuance of a demolition, grading, or building permit.* If lead-based paint is present, the project applicant shall submit specifications signed by a certified Lead Supervisor, Project Monitor, or Project Designer for the stabilization and/or removal of the identified lead paint in accordance with all applicable laws and regulations, including but not necessarily limited to: Cal/OSHA's Construction Lead Standard, 8 CCR1532.1 and DHS regulation 17 CCR Sections 35001 through 36100, as may be amended.

Condition 54: Asbestos Remediation. *Prior to issuance of a demolition, grading, or building permit.* If asbestos-containing materials (ACM) are present, the project applicant shall submit specifications signed by a certified asbestos consultant for the removal, encapsulation, or enclosure of the identified ACM in accordance with all applicable laws and regulations, including but not necessarily limited to: California Code of Regulations, Title 8; Business and Professions Code; Division 3; California Health & Safety Code 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended.

Condition 55: Other Materials Classified as Hazardous Waste. *Prior to issuance of a demolition, grading, or building permit.* If other building materials or stored materials classified as hazardous waste by State or federal law is present, the project applicant shall submit written confirmation that all State and federal laws and regulations shall be followed when profiling, handling, treating, transporting and/or disposing of such materials.

Condition 56: Health and Safety Plan per Assessment. *Prior to issuance of a demolition, grading, or building permit.* If the required lead-based paint/coatings, asbestos, or PCB assessment finds presence of such materials, the project applicant shall create and implement a health and safety plan to protect workers from risks associated with hazardous materials during demolition, renovation of affected structures, and transport and disposal.

Condition 58: Fire Safety Phasing Plan. *Prior to issuance of a demolition, grading, or building permit and concurrent with any p-job submittal permi.*. The project applicant shall submit a separate fire safety phasing plan to the Planning and Zoning Division and Fire Services Division for their review and approval. The fire safety plan shall include all of the fire safety features incorporated into the project and the schedule for implementation of the features. Fire Services Division may require changes to the plan or may reject the plan if it does not adequately address fire hazards associated with the project as a whole or the individual phase.

Condition 60: Fire Safety. *Prior to and ongoing throughout demolition, grading, and/or construction.*. The project applicant and construction contractor will ensure that during project construction, all construction vehicles and equipment will be fitted with spark arrestors to minimize accidental ignition of dry construction debris and surrounding dry vegetation.

2. Impacts and Mitigation Measures

This section analyzes the potential impacts related to hazardous materials and public health and safety that could result from implementation of Measure DD. The section begins with the criteria of significance, which define which establish the thresholds for determining whether a project impact is significant. Potential hazardous materials and public health and safety impacts from the proposed project are then presented, with mitigation measures to reduce potential impacts to less-than-significant levels.

a. Criteria of Significance. The project would have a significant impact on the environment if it would:

1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

5) Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;

6) Be located within the vicinity of a private airstrip, and would result in a safety hazard for people residing or working in the project area;

7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

8) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The level of impact to hazards and hazardous materials is discussed in the following section and summarized in Table IV.J-1.

b. Impacts and Mitigation Measures Applicable to All Project Groups. Several of the impacts related to hazards and hazardous materials that may result from the implementation of Measure DD would essentially be the same for each or most of the four project groups. These impacts are evaluated below for each criterion of significance. Where applicable, the City's Standard and Uniformly Applied Conditions of Approval (Standard Conditions of Approval, described above under Section IV.J.1.f) that would address those impacts are listed.

(1) Routine Transport, Storage, Use or Disposal of Hazardous Materials. There would be no significant increase in the routine transport, storage, use, or disposal of hazardous materials, following construction of proposed projects within the Lake Merritt and Lake Merritt

Channel, Waterfront Trail, and City-wide Creeks groups. Any hazardous materials (e.g., pesticides, herbicides, fuels) used for maintenance projects for the proposed project groups (e.g., trail, landscape, building/structure maintenance activities) would not be stored on-site since no chemical storage areas are proposed. These hazardous materials would be temporarily brought to the site to complete specific maintenance activities.

Hazardous materials may, however, be stored on-site for the Recreational Facilities group (e.g., continued use photochemicals at the Studio One Arts Center and pool chemicals at the East Oakland Sports Complex). Any transport, storage, generation, use, and/or disposal of hazardous materials following construction of the proposed project would be subject to existing hazardous materials regulations, such as those implemented by OFSA. Compliance with these existing requirements would also minimize the potential for accident conditions involving hazardous material releases and would result in a less-than-significant impact.

(2) Upset and Accident Conditions Involving Hazardous Materials Releases during Construction. For all project groups there is some potential that hazardous materials (e.g., fuels, paints) used during construction may be released accidentally to the environment.

Table IV.J-1: Summary of Potential Impacts – Hazards and Hazardous Materials

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	O	O	O	O
2. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	O	O	O	O
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	==	==	O	==
4. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	O	O	O	O
5. Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area?	==	O	==	O
6. Be located within the vicinity of a private airstrip, and would result in a safety hazard for people residing or working in the project area?	==	==	==	==
7. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	**O** HAZ-1	O	O	O

Would the Project:	Project Group[a]			
	Group 1 Lake Merritt	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
8. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	==	==	==	O

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant with recommended mitigation
● Significant
NA Not Applicable
HAZ-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

Hazardous materials (e.g., fuels/lubricants, paints, adhesives) would be transported and used on-site for construction and redevelopment activities. In addition, construction vehicles could accidentally release hazardous materials, such as oils, grease or fuels. It is likely that these hazardous materials and vehicles would be stored by the contractor(s) at the location of the active worksite(s) for the period of construction at that location. Accidental releases of hazardous materials could impact soil and/or groundwater quality, or could result in adverse health effects to construction workers, the public, and the environment.

Construction activities will be in accordance with the Storm Water Pollution Prevention Plan (SWPPP) required for the each project component during construction activities (See Section IV.H, Hydrology and Water Quality Section, Standard Condition of Approval 62: Storm Water Pollution Prevention Plan (SWPPP)). The SWPPP will include Best Management Practices including requirements for hazardous materials storage during construction to minimize the potential for releases to occur (See Section IV.H, Hydrology and Water Quality Section).

The City and its construction contractor will also implement construction best management practices to prevent misuse of hazardous materials in accordance with the Standard Condition of Approval 25, above. All use, storage, transport, and disposal of hazardous materials during construction activities will be performed in accordance with existing local, state, and federal hazardous materials regulations.

In the event of an accidental spill of hazardous materials or other hazardous materials-related emergency during construction of the proposed project (Groups 1-4), the spill response actions required by the project's Health and Safety Plan and SWPPP as required by Standard Conditions of Approval 56, 62, and 68 (above and in Section IV.H, Hydrology and Water Quality) will be implemented. These plans would include an emergency response plan for safe and effective responses to emergencies, including the necessary personal protective equipment and other

equipment, and spill containment procedures for protection of workers, the public and the environment.

With compliance with the applicable City of Oakland's Standard Conditions of Approval and existing local, state, and federal hazardous materials regulations, use and potential accidental spills of hazardous materials during construction would be a less-than-significant impact

(3) Emit Hazardous Emissions or Use Acutely Hazardous Materials within One-Quarter Mile of an Existing or Proposed School. There would be no significant increase in hazardous materials emissions or use of acutely hazardous substances within one-quarter mile of an existing or proposed school following construction of the proposed project. With the exception of the Recreational Facilities group, hazardous materials would not be stored on-site, would only be temporarily brought on-site for construction or maintenance purposes, and therefore would not be expected to result in any potential impacts to nearby schools.

Sodium hypochlorite is currently used for disinfection of pool water in Oakland and would continue to be used for water disinfection at the East Oakland Sports Complex.[49] Sodium hypochlorite, a liquid, is not an acutely hazardous material[50] and would not result in hazardous air emissions during routine operations or as a result of an accidental release. No acutely hazardous materials were identified as being used at Studio One.[51] Any potential hazardous emissions or use of acutely hazardous materials within one-quarter mile of a school associated with the Recreational Facilities group would therefore not occur. As discussed above, any hazardous materials must be managed and stored in accordance with applicable hazardous materials regulations. Compliance with these requirements minimizes the potential for upset or accident conditions involving hazardous materials releases. With compliance with existing local, state, and federal hazardous materials regulations this would be a less-than-significant impact

(4) Hazardous Materials Sites. While none of the component sites were found on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, contaminated soil is known to occur at some sites (e.g., the Cryer Site) and there is some potential to encounter hazardous materials during construction activities due to historical placement of fill from unknown sources and historical site uses. The City's Standard Condition of Approval 50: Phase I and/or Phase II Reports and Standard Condition of Approval 52: Environmental Site Assessment Reports Remediation are included as part of the project and would reduce most of these potential impacts to a level that is less than significant as described below. If hazardous materials or hazardous waste are encountered unexpectedly at a previously unidentified location, Condition of Approval 25 would reduce the impact to a level that is less than significant.

Potential sources of subsurface contamination identified in previous investigations within the proposed project area include the placement of fill, past industrial land uses, and nearby roadways and railroad alignments. Fill materials of unknown origin are known to have been placed along the existing Lake Merritt roadways, along the Lake Merritt Channel, and along areas proposed for the Oakland Waterfront Trail. Industrial land uses along the Lake Merritt Channel and areas proposed for the Oakland Waterfront Trail may have contributed to soil and/or groundwater

[49] Joel Peter, City of Oakland, personal communication with Dennis Brown, LSA Associates.

[50] Title 8, CCR Section 5189.

[51] EDR, 2007a., op. cit.

contamination if historical hazardous materials releases have occurred at these locations. In addition, aerially-deposited lead and other contaminants may be present in shallow soil near roadways and rail lines.

At many locations for the Lake Merritt and Lake Merritt Channel group and the Waterfront Trail group, subsurface investigations have been completed, contamination has been identified, and/or soil remediation plans have been prepared or are currently being negotiated with regulatory oversight agencies. Subsurface investigations completed around Lake Merritt and Lake Merritt Channel have identified soluble metals at concentrations above California hazardous waste thresholds. Soils containing metals above California hazardous waste thresholds would be classified as a hazardous waste, once excavated, and would require special handling and disposal procedures. Subsurface investigations completed within the Oakland Waterfront Trail have identified metals, PAHs, petroleum hydrocarbons and slag as potential contaminants of concern. Investigations completed within the proposed Oakland Waterfront Trail project area have also identified some metals in excess of Federal and State hazardous waste criteria; these impacted soils could constitute hazardous wastes, and require special management and disposal, if hauled off-site.

Workers grading, excavating or disturbing soil and/or groundwater containing hazardous materials and hazardous wastes or previously unknown hazardous materials/wastes could experience adverse health effects. The severity of health effects would depend on the contaminant(s), concentration, use of personal protective equipment, and duration of exposure. Adverse health effects could also be experienced by nearby receptors (e.g., nearby residents and workers) during earthwork activities where hazardous materials in soil and/or groundwater are released.

Prior to issuing construction, grading, excavation or building permits for construction activities involving soil disturbance, the City would investigate whether soil or groundwater contamination requiring remediation is present in accordance with Standard Condition of Approval 50. Although not explicitly stated in the Standard Condition of Approval, the Phase I and/or Phase II environmental site assessment (ESA) investigation would be performed in conformance with state and local guidelines and regulations and industry standards, including the most recent standards adopted by ASTM International, (e.g., would be prepared by a qualified professional such as a California-registered environmental assessor, Professional Geologist, or Professional Engineer) for all project components.

The ASTM standard for Phase I ESAs requires a review of regulatory agency information, including Government Code 65962.5 hazardous material release sites. A Phase II ESA would assess the presence and extent of contamination at the site (if any) and the potential risk to human health and public safety, including construction workers and nearby receptors and future site users. A Phase II ESA would also include an evaluation for the presence of aerially-deposited lead at proposed project locations within proximity to roadways or railways in accordance with Standard Condition of Approval 50.

If the results of the subsurface Phase II investigation(s) indicate that remediation is required, the City would ensure that site remediation is completed under the oversight of the applicable state or local regulatory agency, in accordance with the Standard Condition of Approval 52. In making the assessment as to whether remediation is required, data collected in the investigations would

be compared to hazardous wastes thresholds and/or applicable Water Board ESLs. Compliance with the Standard Condition of Approval 52 also ensures that a Soil Management Plan (SMP) would be prepared and implemented for handling and disposing of impacted soil and/or groundwater in accordance with hazardous materials laws and regulations and standard industry practice.

As part of compliance with Standard Condition of Approval 52, the City would submit applicable documentation and plans required by the regulatory oversight agency regarding remediation of the contaminated soil and/or groundwater at the site. In accordance with federal and state worker safety laws and regulations and standard industry practice, the documentation and plans would include the requirement for the preparation and implementation of a project-specific Health and Safety Plan (HSP) for site workers.

Even with proper investigation of past land uses with hazardous materials uses, subsurface Phase II environmental site assessments, and completion and certification of remediation (as needed) required by Standard Conditions of Approval 50 and 52, previously unknown contaminated soil and/or groundwater or other hazards may be encountered during site development activities by construction workers resulting in adverse health effects. Standard Condition of Approval 25 describes the actions that would be taken if soil, groundwater or other environmental medium with suspected contamination were encountered during construction activities. Suspect materials might include environmental media with an identified odor or visual staining. It might also include underground storage tanks, abandoned drums or other evidence of hazardous materials or wastes. Implementation of Standard Condition of Approval 25 would reduce this potential impact to a less-than-significant level.

(5) Aviation Hazards. No private airstrips are located within a two-mile radius of any project components.[52] Two project groups, the Oakland Waterfront Trail and East Oakland Sports Complex, are located near the Metropolitan Oakland International Airport (Oakland Airport).[53] There are height restrictions on buildings or structures located within proximity of airport runways in accordance with the Federal Aviation Administration Part 77 regulations. For each 100 feet of distance from a runway, one foot of structure height is permitted, up to a maximum of 20,000 linear feet distance (equivalent to approximately 3.78 miles) at which point there are no height restrictions.[54] No structures are proposed at the southern portion of the Oakland Waterfront Trail which could be subject to these height restrictions. Structures are planned for the East Oakland Sports Complex, located approximately 4,133 feet linear distance (equivalent to 0.78 mile) from the Oakland Airport's closest runway. Structures constructed at this location could not be more than approximately 41 feet in height (or approximately a 4-story structure), based on the proximity of this location to Oakland Airport. The proposed structures at

[52] Information reviewed on-line, http://www.skyvector.com, 12 February 2007.

[53] Proposed project groups located further from OAK, include the Lake Merritt Channel (16,667 feet linear distance from OAK, equivalent to 3.15 miles) and Lake Merritt (17,733 feet linear distance from OAK, equivalent to 3.4 miles). Structures located at these locations could no be more than approximately 167 and 177 feet in height (equivalent to approximately 16 and 17 story buildings, respectively). Development proposed at these locations would not exceed these height restrictions. The North Oakland Recreational Facility, which is located more than 20,000 linear feet from OAK's runways, would not be subject to any height requirements or result in any aviation hazard.

[54] Horvath, Cindy, Senior Transportation Planner, Alameda County Airport Land Use Commission, 2007, personal communication with J. Pettijohn, Baseline, 15 February.

the East Oakland Sports Complex would not exceed the FAA height restrictions, and would therefore have a less-than-significant impact on aviation hazards.

(6) Emergency Response Plan/Emergency Evacuation Plan. The City of Oakland has adopted the Standard Emergency Management System (SEMS), a framework for standardizing emergency response procedures in California. The Oakland Office of Emergency Services' SEMS emergency plan describes how City agencies would respond to declared emergencies in the City. The Plan must be routinely updated in accordance with Action PS-1.2 of the General Plan.[55]

Evacuation routes for the City of Oakland are presented in the General Plan Safety Element as part of the overall emergency plan for the City of Oakland.[56] All project groups are located near a designated evacuation route. For the Lake Merritt and the Lake Merritt Channel group, the thoroughfares that immediately surround Lake Merritt are designated evacuation routes, including Lakeside Drive, Harrison Street, Grand Avenue, Bellevue Avenue, Lakeshore Avenue, 12th Street, and 7th Street. For the Oakland Waterfront Trail and Access group, thoroughfares that parallel the Oakland Harbor and San Leandro Bay, including East 6th Street/East 7th Street/East 8th Street/East 12th Street, Embarcadero and San Leandro Street, serve as designated evacuation routes. For the Studio One Art Center, Broadway and Highway 24 are the closest designated evacuation routes, and Hegenberger Road is the closest designated evacuation route for the East Oakland Sports Complex. Other evacuation routes are located throughout the City which could be used in the event of evacuation from any City-wide Creeks.

The project would not affect evacuation routes in the vicinity of the Waterfront Trail, Recreational Facilities or City-wide Creeks groups. Work proposed in the Lake Merritt area and northern portion of the Lake Merritt Channel (7th and 12th Streets) would include street construction activities on designated evacuation routes identified in the General Plan. Under one construction phasing option for 12th Street, the street would be closed during construction.

Impact HAZ-1. The Reconstruction of 12th Street would temporarily close a designated emergency evacuation route. (S)

> Mitigation Measure HAZ-1: In advance of construction, the City shall prepare detour plans for the emergency evacuation route along 12th Street in accordance with the City's Office of Emergency Services requirements. The plans shall be reviewed and approved by the Office of Emergency Services prior to the start of construction. The implementation of the plans during construction would ensure that alternative emergency evacuation routes are identified and available during project construction and would reduce the impact to a less-than-significant level. (LTS)

(7) Wildland Fires. All project groups, with the exception of the City-wide Creeks, are located outside of the City of Oakland Wildfire Prevention District area of designated "high fire hazard areas."[57] Routine inspection of these project group areas for the purpose of reducing the potential for wildfires is not conducted by the Oakland Fire Department, because they are located

[55] City of Oakland General Plan, Safety Element, Public Safety, p. 15 and p. 19.

[56] City of Oakland General Plan, Safety Element, Figure 2.1, Public Safety.

[57] Information reviewed at http://www.oaklandnet.com/wildfirePrevention/default.htm, 16 February 2007.

outside the high fire hazard area. Some components of the City-wide Creeks group may be located within areas designated as high fire hazard areas, but no structures are proposed as part of the creek projects and all project components would comply with Standard Condition of Approval 60 requiring the use of spark arrestors on all construction vehicles and equipment to minimize accidental ignition of construction debris and surrounding vegetation. The proposed project would therefore not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas. This is a less-than-significant impact.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential impacts that are unique to individual project components. There are no component-specific impacts associated with Criteria of Significance 1 and 3 through 8.

(1) Upset and Accident Conditions Involving Hazardous Materials Releases. ACM, lead-based coatings and PCBs may occur in buildings and other structures (e.g., overpasses) that would be demolished or renovated as part of the project. The City's Standard Conditions of Approval 29, 51, 53, 54, and 56 address these issues and are included as part of the project. Implementation of the Conditions of Approval would reduce the potential impacts to a level that is less than significant as described below.

Lead-based paint and ACM surveys and abatement have been completed for various structures considered under the proposed project in groups 1, 2 and 3 (e.g., Lake Merritt Municipal Boat House, Cryer Site within the Oakland Waterfront Trail group, Studio One). However, similar surveys have not been completed for culverts over Lake Merritt Channel and overpasses in the 12th Street project area that are planned for demolition, nor have surveys been completed for all structures planned for renovation or modification around Lake Merritt, along the Oakland Waterfront Trail, or at the East Oakland Sports Complex site. The criterion is not applicable for the City-wide Creeks group. [58]

Based on the date of construction, lead-based paint or ACM could also be encountered during renovation of the Sailboat House. The last remodeling of the Sailboat House was completed in 1998. In addition, the Steam Valve Building within the Oakland Waterfront Trail group may be renovated or demolished under the proposed project. A lead-based paint and asbestos containing survey has not been completed for this location. This structure was constructed prior to the 1980s and could contain lead, ACM, or other hazardous building materials.

No PCB surveys were identified for buildings identified for demolition or renovation in information made available for review for the proposed project. As a condition of approval for any demolition permit for a structure potentially containing lead, asbestos, or PCBs under the proposed project, a lead-based paint, asbestos-containing material, and PCB survey would be performed at the structure by a qualified environmental professional in accordance with the City's Standard Condition of Approval 51. Also, any major modification to structures requires a similar survey for those portions of the structure to be modified in accordance with this condition. Based on the findings of the survey, all identified lead-based paint, asbestos and/or PCB hazards will be abated by a certified contractor in accordance with local, state, and federal requirements,

[58] This impact is not applicable to the City-wide Creeks group, since the proposed project includes no demolition or renovation of structures associated with citywide creeks.

including the requirements of the Bay Area Air Quality Management District for asbestos (Regulation 11, Rule 2). The findings of the survey will be documented by a qualified environmental professional, a plan for remediation of the hazardous building materials, and documentation of the remediation will be prepared by the City in accordance with Standard Conditions of Approval 29, 53, 54 and 56.

Other hazardous materials and wastes generated during demolition activities, such as fluorescent light tubes and mercury switches, will be managed and disposed of by the demolition contractor(s) in accordance with applicable universal waste and hazardous waste regulations. Federal, state and local worker health and safety regulations would apply to demolition or renovation activities, and the City's required worker health and safety procedures (Standard Condition of Approval 56) would be implemented for the protection of workers.

This impact is considered less than significant with implementation of the Standard Conditions of Approval and local, state, and federal hazardous materials and worker health and safety requirements.

K. PUBLIC SERVICES AND RECREATION

This section describes public services and recreational facilities serving the areas in which the Measure DD Implementation Project components are located and evaluates the effects of the proposed components on those services. Potential impacts to public services that could result from implementation of the Measure DD components are identified, and mitigation measures are recommended, as appropriate.

1. Setting

This section describes current service locations, capacities, and expansion possibilities for police services, fire services, and parks that would serve the project area. Relevant regulations and service requirements are also discussed.

a. Police Services. Police services are provided by the Oakland Police Department (OPD). OPD staffs the Primary Public Safety Answering Point, dispatches patrol officers to both emergency and non-emergency calls for service, conducts preliminary and follow-up criminal investigations, has primary traffic enforcement jurisdiction on all public roadways within the City, except for freeways, maintains preventative patrols, and supports community policing efforts, as well as various other duties. Police headquarters are located in downtown Oakland at 455 7th Street.

The OPD has an authorized staffing level of 803 sworn positions and 357 civilian (non-sworn) employees. The OPD is currently staffed with approximately 710 officers and 320 civilian staff. The majority of staff are paid with a very limited number of volunteer staff for projects that do not require community contact or confidential activities. The City has a police to resident ratio of approximately 1.7 officers per 1,000 residents, based on the City's population of 415,492 persons, as of January 2007.[1]

Oakland is comprised of six police service areas that are divided into 57 police beats. The Lake Merritt and Lake Merritt Channel project group is located in Beats 1X, 3X, 4X, 14X, 15X, and 19X. Law enforcement concerns in these project areas include theft, burglary, vehicle theft, and simple assault.[2] The Lake Merritt Channel area also has had issues with homeless people living and vandalizing the area. The Waterfront Trail and Access project group is located in Beats 1X, 19X, 20X, 23X, and 26X. Primary law enforcement concerns in these beats include vehicle theft, theft, narcotics, and robbery.[3] Studio One is within Beat 12X and the East Oakland Sports Complex is within Beat 31Y. The creek restoration projects are located in beats across the City.

During most shifts, officers are continuously responding to calls and have little or no time to work pro-actively with residents and business persons within their beats. Officers conduct preventative patrols as time permits. Calls for service are defined and dispatched based on their urgency. Priority 1 calls are the most serious and are dispatched within one to two minutes after the call is received. The average response time for emergency calls for service in 2006 was 6.25 minutes. Priority 2 calls

[1] California Department of Finance, 2007. *E-4 Population Estimates for Cities, Counties and the State, 2001–2007, with 2000 Benchmark*. January 1.

[2] Oakland Police Department, 2007. Crimewatch (incident reports for the 90-day period 12/1/06 to 2/28/07 within a 500 foot radius of Lake Merritt area parks). Website: gismaps.oaklandnet.com/crimewatch/wizard.asp.

[3] Oakland Police Department, 2007. Crimewatch (incident reports for the 90-day period 12/1/06 to 2/28/07). Website: gismaps.oaklandnet.com/crimewatch/wizard.asp.

represent the greatest volume of calls and consist of offenses such as domestic disputes and stolen vehicles and average response time in 2006 was approximately 1 hour. Priority 3 and 4 calls are non-emergency and average response times for 2006 exceeded 2 hours.[4] Due to staffing constraints, some lower priority calls may be handled by non-sworn civilians.

b. Fire Protection Services. Fire protection services are provided by the Oakland Fire Department (OFD). The OFD serves the City of Oakland and has mutual response agreements with the cities of Berkeley, Piedmont, and Alameda, Alameda County and Contra Costa County Fire Departments, and the East Bay Regional Park District. In addition to fire suppression, fire prevention, and emergency medical services (EMS), the OFD provides services through the Office of Emergency Services (OES), Citizens of Oakland Respond to Emergencies (CORE), the Wildfire Prevention District, and Emergency Dispatch.

The OFD's fleet includes 25 type-1 engines, four type-3 engines, seven aerial ladders, eight brush patrols, a fireboat, a heavy-rescue vehicle, two foam units, six airport rescue rigs, and four hose tenders.[5] The OFD is a professional organization consisting of 591 employees, of which 500 are uniformed personnel. Of those, 93 are trained paramedics and the remaining 407 are trained emergency medical technicians (EMTs).[6] Daily shift staffing at the City's 25 fire stations consists of 136 personal. There are no volunteer positions.

The Oakland Fire Department has a standard response time goal of seven minutes from dispatch to time of arrival 90 percent of the time.[7] Service areas within 1.5 miles of a fire station are generally served within the service standard time. The majority of the City, including the project sites, is located within 1.5 miles of one of Oakland's 25 fire stations.

The OFD provides emergency medical services through the EMS division and is frequently a first responder in an emergency. Approximately 80 percent of calls to the OFD for emergency services are medical emergencies.[8] At least one paramedic staffs each fire station engine and firefighters are certified as emergency medical technicians. Private companies provide ambulance services under contract with Alameda County.

c. Parks and Recreation. The City of Oakland Office of Parks and Recreation (OPR) provides recreational and cultural programs for residents of the City. OPR manages over 3,000 acres of parkland within the city limits. Facilities include 24 recreation centers, 140 parks and playgrounds, 54 ball fields, 7 outdoor swimming pools, 50 tennis courts, and 2 public golf courses.[9] Maintenance of these facilities is provided by the Oakland Public Works Agency.

[4] Poirier, Michael, 2007. *Chief of Staff, Oakland Police Department.* Personal correspondence with LSA, Associates. May 15.

[5] Oakland, City of, 2004. *Safety Element, General Plan*. November. Pg. 59.

[6] Edwards, James D., 2007. *Deputy Chief, Fire Prevention Bureau/Communications, Oakland Fire Department*. Written communication with LSA Associates Inc. February 28.

[7] Ibid.

[8] Oakland, City of, 2006. *Oakland Fire Department, Operations*. Website: www.oaklandnet.com/oakweb/fire/.

[9] Oakland, City of, 2005. *Office of Parks and Recreation.* Website: www.oaklandnet.com/parks/default.asp.

The City of Oakland parks classification system emphasizes neighborhood, community and region-serving parks but consists of seven additional park categories including: active mini-parks; passive mini-parks; linear parks; special use parks; resource conservation parks; athletic field parks (including school athletic fields); and school playgrounds. The City has a 10 acre per 1,000 residents park acreage standard and a 4 acre per 1,000 residents local-serving park acreage standard (includes parks with facilities that are not special purpose). The City provides approximately 8.26 acres of parkland per 1,000 residents and 1.33 acres of local serving park acreage per 1,000 residents.[10] Because Oakland is predominantly developed, there are limited areas to develop parkland. Existing opportunities for improving the parkland per capita ratio include expansion of existing parks, improvement of creek and shoreline access, acquisition of vacant parcels, and incorporation of new parks in major redevelopment projects.

The Measure DD Implementation Project components are located in most City planning areas including: North Hills, North Oakland, Lower Hills, Chinatown/Central, San Antonio, Fruitvale, Central East Oakland, South Hills, and Elmhurst. City of Oakland parks that would be affected by Measure DD Implementation Project components are described below for each project group.

(1) Lake Merritt and Lake Merritt Channel (Group 1). The following paragraphs describe the parks around Lake Merritt starting at the northwest corner of the Lake and moving in a clockwise direction. These descriptions are followed by parks located adjacent to Lake Merritt Channel.

Adams Park and the Veterans Memorial Building are located at the northwest corner of Lake Merritt at Harrison Street and Grand Avenue and provide space for private events and senior activities. Lakeside Park at Grand Avenue and Bellevue Avenue includes a Lawn Bowling Clubhouse and Greens, non-programmed open space, Children's Fairyland, McElroy Fountain and Specimen Groves, Edhoff Band Stand, a beach, amphitheater, Garden Center, Junior Center of Art & Science, the Sailboat house, the Rotary Nature Center, OPD horse stables, and wildlife areas.

The Lakeshore Avenue edge of Lake Merritt connects viewpoint areas and parks along the Lake including: Eastshore Park at the northeast edge of the Lake and includes the Pergola, Lakeview Branch Library, tot lot, ballfields and Splash Pad Park, which hosts the Farmer's Markets; Cleveland Cascade, a public stairway connecting Lakeshore Avenue and Merritt Avenue south of Boden Way; Pine Knoll Park at Hanover Avenue and Lakeshore Avenue; East 18th Street pier; and Athol Park and tennis courts.

Park facilities on the west side of Lake Merritt along Lakeside Drive include: the Cameron-Stanford House, a historic Victorian house-museum at 1418 Lakeside Drive; the Municipal Boathouse; and Snow Park at 19th Street and Harrison Street, a 4.2-acre park that provides a golf putting green, volleyball and picnic areas.

Rancho Peralta Park, located at 34 East 10th Street proximate to the Kaiser Convention Center and generally bounded by East 12th Street to the north and East 10th Street to the south, has a passive open space, a playground, trails and connections to Lake Merritt. The Lake Merritt Channel Park between

[10] Oakland, City of, 1996. *Open Space, Conservation, and Recreation (OSCAR) Element, General Plan.* June. Pg. 4-9.

7th Street and I-880 has a sculpture garden, jogging trails, and space for events. Estuary Park is an approximately 7-acre park located at 5 Embarcadero with boat ramps, existing play field, hardscape, seating area, and the Jack London Aquatic Center building.

(2) Waterfront Trail (Group 2). The Bay Trail Plan was adopted by the Association of Bay Area Governments (ABAG) in 1989 and planned for approximately 400 miles of trails to form a "ring around the Bay." The Waterfront Trail proposed as part of Measure DD would complete approximately 3.4 miles[11] of missing segments of a 6.6-mile portion of the trail between Jack London Square and 66th Avenue. The trail would link existing and proposed waterfront parks: including Estuary Park, Fruitvale Bridge Park, Union Point Park (completed 2005), and the East Bay Regional Park District's Martin Luther King Jr. Regional Shoreline Park.

(3) Recreational Facilities (Group 3). Recreational facilities included as part of the Measure DD include Studio One Art Studio and the East Oakland Sports Complex. Studio One is an arts facility located at 365 45th Street. It offers classes in stained glass and glass fusing, jewelry making, painting, drawing, ceramics, sculpture, photography and other studio arts. Renovation of the building has begun and art classes are temporarily being held in a facility at the Malonga Casquelourd Center for the Arts at 1428 Alice Street in Oakland.

The East Oakland Sports Complex would expand the existing Ira Jinkins Recreation Center located at 9175 Edes Avenue. Existing facilities at the site include the recreation center, East Oakland Multipurpose Senior Center, Brookfield Branch Library, and Brookfield Head Start Center. The facility provides ball fields, tennis courts, a play area, and picnic area and provides programs for before/after school care and athletic training for teen and young adults.

(4) City-Wide Creeks (Group 4). Creeks would be restored at several parks managed by the City of Oakland OPR including: Knowland Park, Dimond Park, Shepherd Canyon Park, Garber Park, Oak Glen Park, Courtland Creek Park, North Oakland Sports Field, Leona Open Space, Joaquin Miller Park, Peralta Hacienda Park, McCrea Memorial Park, Sanborn Park, Beaconsfield Open Space, Sobrante Park, Rainbow Recreation Center, and Mosswood Park. Most parks are a few acres in size, such as Sanborn and Oak Glen Park, but the approximately 500-acre Jaoquin Miller Park is also included in the project group. The parks offer a variety of recreational opportunities including hiking, biking, playing fields and recreational centers.

The East Bay Regional Park District (EBRPD) provides additional open space recreation opportunities for Oakland residents. EBRPD has 65 parks and 29 regional inter-park trails covering more than 95,000 acres in Alameda and Contra Costa counties. Regional parks in and near Oakland include: Tilden Regional Park; Claremont Canyon; Sibley and Huckleberry Regional Preserves; Temescal Regional Recreation Area; Leona Heights Open Space Regional Preserves, and Redwood and Chabot Regional Parks. Martin Luther King Jr. Regional Shoreline is the located at Doolittle Drive and Swan Way along San Leandro Bay. The 1,220-acre shoreline park includes picnic areas with barbeques, a boat launch ramp, children's play area, a turfgrass field, fishing piers, and a wheelchair accessible observation deck. The shoreline park links with the Waterfront Trail at 66th Avenue, where some Measure DD improvements are proposed.

[11] Association of Bay Area Governments, 2005. *The San Francisco Bay Trail Project, Gap Analysis Study.* September.

City of Oakland policies related to parks and recreation are described in Section IV.B., Planning Policy.

2. Impacts and Mitigation Measures

This section discusses potential impacts to public services and recreation that could result from implementation of Measure DD. The section begins with the criteria of significance, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with Measure DD Implementation Project components and identifies mitigation measures, as appropriate.

a. Criteria of Significance. The public services and recreation criteria, which are utilized to determine whether the projects impacts would be considered significant, are listed below.

The project would have a significant impact on public services and recreation if it would:

1) Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for:
   a) police services; or
   b) fire and emergency services.
2) Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
3) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

The level of impact to public services and recreation is discussed in the following section and summarized in Table IV.K-1.

b. Impacts and Mitigation Measures Applicable to all Project Components. The potential public services and recreation impacts that could result from implementation of Measure DD would be essentially the same for each of the four project groups, as described below.

(1a) Police Services. Some Measure DD Implementation Project components, such as the expanded East Oakland Sports Complex, the Boathouse restaurant and café, and public access and waterfront trails, may incrementally increase demand for police services. However, the increased demand would be small and spread over many police beats. The project components would not create venues where large groups of people would congregate for concerts or promote other activities that would demand police services.[12] Thus, project components would not require an increase in staffing levels or the construction of any new facilities. For a city the size of Oakland, the national police service standard is one officer per 1,000 residents. Based on the current, active count of 710 officers, the City maintains an officer to resident ratio of approximately one officer per 588 residents and OPD currently has an adequate number of police officers to serve the project components. The proposed

[12]Jeffrey H. Israel, Deputy Chief of the Bureau of Field Operations, Oakland Police Department.

Table IV.K-1: Summary of Potential Impacts – Public Services and Recreation

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Adversely impact a. police services, or	O	O	O	==
b. fire and emergency services?	O	==	O	==
2) Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated?	O	==	O	==
3) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	O	O	O	==

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:
== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not applicable.
PUB-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007.

Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities groups would have a less-than-significant impact on police services. Creek restoration and acquisition activities would not increase demand for police services. There would be no impact associated with the City-wide Creeks group.

(1b) Fire Protection Services. Some proposed project components, such as construction of the East Oakland Sports Complex or the conversion of the Municipal Boathouse from office to restaurant use could create an incremental increase in demand for fire and emergency services within the City of Oakland. However, the increased demand would be small and spread over several service areas.

New construction, including the roadway reconfiguration associated with the Lake Merritt and Lake Merritt Channel group, would be subject to plan review by the OFD to ensure proper life safety standards and adequate emergency response access during road closures. Creek restoration projects would restore natural habitat, prevent erosion, and improve water quality in compliance with the City of Oakland Creek Protection Ordinance[13] and the Oakland Wildfire Prevention District's

[13] Oakland Municipal Code, Chapter 13.16, Creek Protection, Stormwater Management and Discharge Control.

recommendations for ecologically sensitive fire abatement vegetation management practices. Therefore, the Measure DD Implementation Project would not adversely impact fire services.[14]

The increase in demand for fire and EMS services could be met by existing facilities and the increased demand would not require the construction of any new facilities (i.e., new fire station) to provide adequate fire protection. The proposed Lake Merritt and Lake Merritt Channel group and Recreational Facilities group would have a less-than-significant impact on fire protection services. Creek restoration and acquisition activities and completion of the Waterfront Trail would not increase demand for fire protection services. There would be no impact associated with the Waterfront Trail or City-wide Creeks groups.

Some proposed project components would improve fire services including the fire hydrant improvements completed for the Children's Fairyland, Bellevue Avenue, and Sailboat House areas and the renovation of Studio One.

(2) Adversely Impact Parks or Recreation Facilities because of Increased Demand. Measure DD Implementation Project components would not construct new residential or commercial spaces and thus would not increase demand for park services. The project components would enhance existing recreational opportunities and create new ones. Therefore, implementation of proposed project components would not substantially increase demand for neighborhood parks, regional parks, or recreational recreation facilities, such that substantial physical deterioration of the facility would occur or be accelerated. There would be no impact associated with the Waterfront Trail or City-wide Creeks groups. Potential construction impacts unique to the Lake Merritt and Lake Merritt Channel and Recreational Facilities groups are discussed in Section IV.K.2.c.

(3) Require Construction or Expansion of Recreational Facilities that would have an Adverse Impact on the Environment. The City-wide Creeks group would not create or expand recreational facilities. The Lake Merritt and Lake Merritt Channel, Waterfront Trail and Recreational Facilities groups would construct or otherwise improve recreational facilities in existing parks and developed urban areas. There is some potential for the construction of new recreational facilities to adversely impact the environment. These potential impacts are discussed under specific topic areas in this EIR. For example, potential impacts to migrating waterfowl in the Lake Merritt Channel due to its potential increased recreational use are discussed in Section IV.F, Biological Resources, and potential impacts from hazardous waste at some sites along the Waterfront Trail are discussed in Section IV.J, Hazards and Hazardous Materials. In general, the Measure DD Implementation Project would enhance and expand existing recreation opportunities as well as improve the natural ecosystem of park areas. The renovated and new recreational facilities would not have potential adverse physical effects on the environment beyond those discussed in specific topic areas of this EIR.

c. Impacts and Mitigation Measures Unique to Specific Project Components. This section describes potential land use impacts that are unique to individual project components.

Adversely Impact Parks or Recreation Facilities because of Increased Demand. Construction of the 12th Street component of the Lake Merritt and Lake Merritt Channel group would

[14] Edwards, James D., 2007. *Deputy Chief, Fire Prevention Bureau/Communications, Oakland Fire Department.* Written communication with LSA Associates Inc. February 28.

temporarily remove from service the bike lane along the roadway on the south side of Lake Merritt. However, the 12th Street construction would be staged in a way that would maintain pedestrian and bicycle connections between the east and west sides of Lake Merritt along the sidewalk located on the north side of the Frickstad Viaduct or rerouted onto other streets. This connection would be maintained until the new roadway is complete. Once the new roadway is complete pedestrian and bicycle connections would be transferred to the new roadway and the viaduct would be demolished. Because removal of the bike lane from the roadway would be temporary and access would be maintained along the sidewalk, this impact would be less than significant.

Construction could temporarily displace activities at the Ira Jinkins Recreation Center and Studio One. Studio One facilities have been temporarily relocated to the Malonga Casquelourd Center for the Arts while Studio One undergoes renovation. Likewise, construction could affect activities at the Ira Jinkins Recreation Center. Similar to Studio One, these activities would be relocated temporarily to other facilities during construction. Impacts on use of or access to existing facilities during the construction period would be short-term. Because the displacement of existing recreational activities to other facilities would be temporary and would not create a long-term increased demand at these facilities this impact would be less than significant.

L. UTILITIES AND INFRASTRUCTURE

This section describes major utilities and infrastructure serving the Measure DD Implementation Project area and evaluates the effects of the proposed project components on utilities and existing infrastructure. Potential impacts to infrastructure and utilities that would result from implementation of the proposed project are identified, and mitigation measures are recommended, as appropriate.

1. Setting

The following infrastructure and utility systems are described and analyzed in this section: water, wastewater, stormwater, solid waste, and energy.

a. Water. The project sites are located in areas served by existing water supplies, treatment facilities, and distribution systems, which are operated and managed by the East Bay Municipal Utility District (EBMUD) as described below.

(1) Water Supply. EBMUD provides potable water to approximately 1.3 million people throughout portions of Alameda and Contra Costa counties, including the City of Oakland. EBMUD obtains approximately 90 percent of its water from the Mokelumne River watershed, and transports it through pipe aqueducts to temporary storage reservoirs in the East Bay hills. EBMUD has water rights and facilities to divert up to a daily maximum of 325 million gallons per day (mgd) from the Mokelumne River.[1] However, this allocation may be constrained by: upstream water use by prior water right holders; downstream water use and other downstream obligations, including protection of public trust resources; drought, or less-than-normal rainfall for more than a year; and emergency outage.

The Mokelumne River can no longer meet EBMUD's projected customer demands during drought periods, even with 25 percent rationing imposed on total customer demand.[2] Average daily water demand within the EBMUD service area was 224 mgd in 2004.[3] This demand is adjusted for conservation and recycled water program savings. Demand is projected to increase to 258 mgd by 2010 and 277 mgd by 2020.[4]

EBMUD is actively involved in securing supplemental water supplies to meet customer demands during drought periods. In dry years, the Freeport Regional Water Project (FRWP) would deliver up to 100 mgd of water from the Sacramento River to EBMUD customers. The FRWP is anticipated to be in-service by 2009. Implementation of this and other water supply projects would reduce the potential for severe water rationing and associated economic losses during drought periods.

(2) Water Treatment Facilities. There are six water treatment plants in the EBMUD water supply and distribution system. Combined, the six plants have a treatment capacity of over 375 mgd.

[1] East Bay Municipal Utility District, 2005. *Draft Urban Water Management Plan 2005*. September.

[2] Ibid.

[3] East Bay Municipal Utility District, 2004. *Annual Report 2004*.

[4] East Bay Municipal Utility District, 2005. op. cit.

The Orinda and the Upper San Leandro Treatment Plants provide water to Oakland.[5] At the treatment plants, water is subjected to coagulation, filtration, and disinfection prior to being distributed to the public. The Orinda Water Treatment Plant has the largest output of EBMUD's treatment plants with a peak capacity of 200 mgd and is operating at approximately 21 percent capacity. The Upper San Leandro Treatment Plant has a capacity of 45 mgd and is operating at approximately 63 percent capacity.[6]

(3) Water Distribution Systems. Water distribution systems in Oakland are divided into pressures zones covering approximately 200-foot elevation ranges. As a result, water pressure ranges from 40 pounds per square inch (psi) to 130 psi. Water pressure is generally adequate throughout the City but pressure may be reduced in some locations with older water mains if they are not sized based on current standards or have lost capacity due to deterioration. Typically, required pipeline relocations and extensions, in addition to other water distribution infrastructure improvements, are made at the expense of the Project applicant in consultation with EBMUD's New Business Office.

b. Wastewater System. The project sites are located in areas served by existing wastewater treatment facilities and collection systems operated and managed by EBMUD.

(1) Wastewater Treatment Facility. EBMUD provides wastewater services to approximately 642,000 people in Alameda and Contra Costa counties.[7] Wastewater collected by interceptors in the EBMUD service area Special District No. 1, which includes the City of Oakland, flows to the Main Wastewater Treatment Plant (MWWTP), which is located in Oakland near the eastern entrance of the San Francisco-Oakland Bay Bridge. Additionally, EBMUD has two wet weather wastewater treatment facilities (WWF) in Oakland, the San Antonio Creek WWF and the Oakport WWF.

The MWWTP provides both primary and secondary treatment of wastewater. Primary treatment involves the removal of floating materials, oils and greases, sand and silt, and organic solids sufficiently heavy to settle in water. Secondary treatment involves the removal of suspended organic and chemical impurities. The MWWTP has a primary treatment capacity of 320 mgd and a secondary treatment capacity of 168 mgd. Storage basins provide plant capacity for a short-term hydraulic peak of 415 mgd. The average annual daily flow into the MWWTP is approximately 80 mgd, representing 48 percent of the plant's secondary treatment capacity.[8] Treated effluent is disinfected, dechlorinated, and discharged through a deep-water outfall one mile off the East Bay shoreline into San Francisco Bay.

In addition, EBMUD has been recycling water at its main wastewater treatment facility since the early 1970s. Recycled water is suitable for land uses that do not require potable water sources, such as

[5] East Bay Municipal Utility District, 2005. *2005 Water Quality Report*. Website:: www.ebmud.com/-water_&_environment/water_quality/annual_report/ebmud_wqr_2005.pdf.

[6] East Bay Municipal Utility District, 2006. *Daily Water Supply Report*. Website: www.ebmud.com-/water_&_environment/water_quality/water_treatment_plants/. February 27.

[7] East Bay Municipal Utility District, 2005. op. cit.

[8] East Bay Municipal Utility District, 2005. Wastewater Treatment. http://www.ebmud.com/wastewater/treatment/. August 23.

golf courses, some agricultural areas, and industrial uses. EBMUD provided more than 8 mgd of recycled water to customers in 2004 and has a goal to recycle 14 mgd by 2020.[9] Incentives used by EBMUD to encourage customers to utilize recycled water include rate discounts on recycled water and low-interest loans used to retrofit buildings so that they can accommodate recycled water.

In January 2002, the City adopted a dual plumbing ordinance, which requires new development to use recycled water provided by EBMUD, and to install a dual plumbing system if recycled water is anticipated to be available. The multi-phased East Bayshore Recycled Water Project will supply up to 2.5 mgd of recycled water to portions of Alameda, Albany, Berkeley, Emeryville, and Oakland. Recycled water use is not planned in the Grand Avenue-Lakeside Park area, although it is available in the 12th Street shoreline park area.

(2) Wastewater Collection System. EBMUD wastewater interceptors consist of 29 miles of reinforced concrete pipes ranging from 1 to 9 feet in diameter. The City owns and maintains the sewer collection system within Oakland, including the project areas. Most of the City's wastewater collection system is 50 years old and some of the existing infrastructure is as old as 100 years.

The City of Oakland's infiltration/inflow correction program consists of a 25-year capital improvement program to rehabilitate the existing system in cost-effective areas and add capacity where needed. This program anticipates a 20 percent growth rate throughout Oakland. Mitigation fees are assessed to all new development or redevelopment in sub-basins that have a growth rate greater than 20 percent. This fee represents the development's pro-rata share of the improvements identified by the 25-year plan in anticipation of the greater-than-20 percent development.

c. Stormwater. The Alameda County Flood Control District was created in 1949 by the State Legislature to provide flood control services to Alameda County. The District's flood control infrastructure includes hundreds of miles of pipelines, channels, creeks, erosion control measures and pump stations. The City of Oakland is within Zone 12, which also includes the City of Emeryville, and is the largest of the District's zones. Zone 12 has approximately 50 miles of closed conduit, approximately 10 miles of earthen and concrete channels, as well as the existing natural waterways, which move stormwater to the San Francisco Bay.[10] Four pump stations lift stormwater to the Bay (Lake Merritt, Ettie, McKillop, and Temescal).

Recent Flood Control District projects include: modifying Lake Merritt Pump Station for increased channel flow and ease of maintenance; repairs to Glen Echo Creek (Line B); $7.8 million upgrades to Trestle Glen Creek (line D) and Line D-1 in the Lake Merritt area; restoration of Sausal Creek, Peralta Creek and Arrojo Viejo Creek; realignment of Lions Creek (Line J); repair of pump 4 at Ettie Street Pump Station; coordinating restoration designs for Peralta Creek (Line F). Fiscal Year 2006 projects planned for Zone 12 include: Pump 3 rehabilitation at the Ettie Street Pump Station; restoration and gate reconstruction on Lion Creek (Line J); and rehabilitation of Lake Merritt Pump Station.

[9] East Bay Municipal Utility District, 2005. op. cit.

[10] Alameda County Flood Control and Water Conservation District, 2005. *Report to the Community, Fiscal Year 2005*.

The City of Oakland's storm drainage system consists of more than 300 miles of storm drainpipes and 15,000 structures (mostly inlets, manholes, and catch basins). The storm drain system is a network of disjointed private and public drainage ways. City-owned drainage systems are improved drainage facilities located within easements and rights-of-way.[11] Existing stormwater drainage systems serve the project areas.

d. Solid Waste. Solid waste and yard trimmings within the City of Oakland are collected by Waste Management of Alameda County. These materials are taken to the Davis Street Transfer Center in San Leandro. The Transfer Center, which has a maximum allowable capacity of 5,600 tons of waste per day, received an average of 3,028 tons per day in 2003.[12] The facility can process up to 320 tons per day of concrete, asphalt, dirt, bricks, wood, and metal. After undergoing processing, waste from the Transfer Station is delivered to the Altamount Landfill in eastern Alameda County. The landfill comprises approximately 2,170 acres (480 acres of permitted landfill area) and has a permitted maximum daily disposal of 11,150 tons per day and an average input of 7,505 tons per day. The landfill is projected to have sufficient capacity to operate until at least 2031 and potential to operate through 2071, depending on waste flows and waste reduction measures.[13]

In 1989, the California Legislature enacted the California Integrated Waste Management Act (AB 939), which requires the diversion of waste materials from landfills in order to preserve the decreasing capacity of landfills. Cities and counties in California were required to divert 25 percent of solid waste by 1995, and 50 percent of solid waste by the year 2000. The City of Oakland met this requirement by diverting 50 percent or greater of its waste from 2000 through 2004.[14,15] AB 939 further requires every city and county to prepare two documents demonstrating how the mandated rates of diversion will be achieved. The *Source Reduction and Recycling Element* describes the chief source of the jurisdiction's waste, the existing diversion programs, and current rates of waste diversion and new or expanded diversion programs. The *Household Hazardous Waste Element* describes each jurisdiction's responsibility in ensuring that household hazardous wastes are not mixed with non-hazardous solid wastes and subsequently deposited at a landfill. Oakland's *Source Reduction and Recycling Element* and its *Household Hazardous Waste Element* were approved in 1995 by the California Integrated Waste Management Board.[16]

The City provides curbside recycling within the City, including the project sites. Curbside recycling includes the following materials: glass, aluminum and tin, motor oil, cardboard, magazines and newsprint, and plastic. Recyclable materials are delivered to the Davis Street Transfer Center where they are processed.

[11] City of Oakland, 2004. *Public Works Agency Standards, Storm Drainage Design Guidelines*, November.

[12] Alameda County Waste Management Authority, 2003. *Alameda County Integrated Waste Management Plan.* February 26.

[13] Ibid.

[14] California Integrated Waste Management Board, 2005. *Jurisdiction Profile for City of Oakland, Waste Stream Information Profiles*. www.ciwmb.ca.gov/profiles/.

[15] Data not available online for subsequent years.

[16] California Integrated Waste Management Board, 2005. op. cit.

Oakland Municipal Code Chapter 15.34 requires building permit applications for new construction, demolition, or alterations and additions (with a valuation of $50,000 or greater) to be accompanied by an approved Waste Reduction and Recycling Plan (WRRP). The WRRP is required to document the ways that the applicant will reduce the quantity of construction and demolition debris disposed at landfills by 50 percent or more. The City does not approve building permits for projects until the WRRP is approved.

e. Energy. The Pacific Gas & Electric Company (PG&E) provides electricity and natural gas service to the City of Oakland, including the Measure DD Implementation Project component sites. Most of Oakland's electrical power is delivered via 12-kilovolt (kV) transmission lines from PG&E Substation L. Substation L receives 155 kV and distributes power to upper downtown Oakland and West Oakland. Local electric and gas distribution lines are located within the project sites. PG&E charges connection and user fees for all new development in addition to sliding rates for electrical and natural gas service based on use. These services are currently available at the project sites.

Title 24, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, details requirements to achieve minimum energy efficiency standards of the State of California. The standards apply to new construction of both residential and nonresidential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating and lighting. Compliance with these standards is verified and enforced through the local building permit process.

f. City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential utilities and infrastructure impacts would be reduced.

> **Condition 26: Waste Reduction and Recycling.** The project applicant will submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Public Works Agency.
>
> *Prior to issuance of demolition, grading, or building permit*
> Chapter 15.34 of the Oakland Municipal Code outlines requirements for reducing waste and optimizing construction and demolition (C&D) recycling. Affected projects include all new construction, renovations/alterations/modifications with construction values of $50,000 or more (except R-3), and all demolition (including soft demo).The WRRP must specify the methods by which the development will divert C&D debris waste generated by the proposed project from landfill disposal in accordance with current City requirements. Current standards, FAQs, and forms are available at **www.oaklandpw.com/Page39.aspx** or in the Green Building Resource Center. After approval of the plan, the project applicant shall implement the plan.
>
> *Ongoing*
> The ODP will identify how the project complies with the Recycling Space Allocation Ordinance, (Chapter 17.118 of the Oakland Municipal Code), including capacity calculations, and specify the methods by which the development will meet the current diversion of solid waste generated by operation of the proposed project from landfill disposal in accordance with current City requirements. The proposed program shall be in implemented and maintained for the duration of the proposed activity or facility. Changes to the plan may be re-submitted to the Environmental Services Division of the Public Works Agency for review and approval. Any incentive programs shall remain fully operational as long as residents and businesses exist at the project site.
>
> **Condition 77: Storm Water and Sewer.** Confirmation of the capacity of the City's surrounding storm water and sanitary sewer system and state of repair shall be completed by a qualified civil engineer with funding from the project applicant. The project applicant shall be responsible for the necessary stormwater and sanitary sewer infrastructure improvements to accommodate the proposed project. In addition, the applicant shall be required to pay additional fees

to improve sanitary sewer infrastructure if required by the City. Improvements to the existing sanitary sewer collection system shall specifically include, but are not limited to, mechanisms to control or minimize increases in infiltration/inflow to offset sanitary sewer increases associated with the proposed project. To the maximum extent practicable, the applicant will be required to implement Best Management Practices to reduce the peak stormwater runoff from the project site. Additionally, the project applicant shall be responsible for payment of the required installation or hook-up fees to the affected service providers.

2. Impacts and Mitigation Measures

This section discusses potential impacts to infrastructure and utility systems that could result from implementation of Measure DD. The section begins with the criteria of significance, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with the proposed projects and identifies mitigation measures, if appropriate. Stormwater and storm drain-related impacts are discussed in Section IV.H, Hydrology and Water Quality.

a. Criteria of Significance. The Measure DD Implementation Project would have a significant impact on the City's infrastructure and utility systems if it would:

1) Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

2) Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board;

3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

4) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

5) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

6) Violate applicable federal, State, and local statutes and regulations related to solid waste;

7) Violate applicable federal, State and local statutes and regulations relating to energy standards; or

8) Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The level of impact to utilities and infrastructure is discussed in the following section and summarized in Table IV.L-1.

Table IV.L-1: Summary of Potential Impacts – Utilities and Infrastructure

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	O	O	==
2) Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board?	O	==	O	==
3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	==	O	==
4) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	==	==	O	==
5) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	O	O	O
6) Violate applicable federal, State, and local statutes and regulations related to solid waste?	O	O	O	O
7) Violate applicable federal, State and local statutes and regulations relating to energy standards?	O	==	O	==
8) Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	==	O	==

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
UTL-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

b. Impacts and Mitigation Measures Applicable to all Project Components. The potential utilities and infrastructure impacts that could result from implementation of Measure DD would be essentially the same for each of the four project groups, as described below.

(1) Exceed water supplies available to serve the project. Some Measure DD Implementation Project components would incrementally increase demand for water supply. A small increase in water consumption could result from irrigation of new parkland and new park facilities (replacement of existing irrigation in many areas would not create additional demand). The East Oakland Sports Complex, an approximately 150,000-square foot addition (including a 50-meter pool and activity pool) to the existing Ira Jinkins Park/Recreation Center with a maximum occupancy of 4,870 persons, has the largest potential water demand of the proposed projects. The East Oakland Sports Complex addition could result in additional demand of 0.08 mgd.[17]

The Municipal Boathouse renovation (including a restaurant, café, and meeting room) might cause a small increase in water usage over the previous use of the site as office space. Renovations of existing facilities, such as the Studio One Art Center, Children's Fairyland and the Sailboat House are not expected to increase use of existing water services, nor would restoration and acquisition activities associated with the City-wide Creeks group. While completion of the Waterfront Trail may increase visitors to waterfront parks this usage would not create a significant demand for water supply services. The incremental increase in water use would not exceed water supplies available to serve the project from existing entitlements.

In compliance with the City of Oakland's dual plumbing ordinance, new development projects would install a dual plumbing system if recycled water will be available from EBMUD. Recycled water will be available in the 12th Street and the Lake Merritt Channel area by mid 2007.[18] For project components in this area, the City would coordinate with EBMUD regarding the installation of separate plumbing systems for recycled water use in landscape irrigation.

The adequacy of existing water mains to accommodate increased demand generated by the East Oakland Sports Complex would be assessed at the time funding is allocated to the project. If line improvements are required due to the age and condition of the existing lines, upgrades would be made during the project construction period and would not be anticipated to result in significant environmental impacts. Additionally, minimum fire flow requirements (for the purpose of fighting fires) would be assessed at the time of project funding. Typically, fire flow requirements are 2,500 gpm for residential uses, and 3,500 gpm for commercial uses.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities groups would have a less-than-significant impact on water supplies and water facilities. The City-wide Creeks group would have no impact on water supplies.

(2) Exceed wastewater treatment requirements. None of the project components would generate wastewater that would cause wastewater treatment requirements to be exceeded.

[17] Prasifka, David, 1994. *Water Supply Planning*. Table 1-6, Summary of Commercial and Institutional Water use.

[18] Kirkpatrick, William, 2006. Comments on the Notice of Preparation of a Draft Environmental Impact Report for Measure DD Projects. Written communication to Elois Thornton, Community and Economic Development Agency, Oakland. December 29.

(3) Exceed wastewater treatment capacity. Most components of the Measure DD Implementation Project, such as park improvements, creek restorations and completion of trail gaps, would not generate wastewater. The project component with the most intensive production of wastewater would be the East Oakland Sports Complex which may generate 0.064 mgd. A small amount of additional demand would be generated by the Municipal Boathouse renovation, which would convert former office space to a restaurant, café, and meeting room. These project components would be located in areas served by existing sewer pipelines and would not require the construction of new wastewater lines.

Wastewater generated by the Measure DD Implementation Project components represents less than 0.1 percent of the MWWTP's secondary treatment capacity. This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater processed by EBMUD's Main Wastewater Treatment Plant. EBMUD has sufficient capacity to treat wastewater flows from the projects during dry weather[19] and would not require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The proposed Lake Merritt and Lake Merritt Channel and the Recreational Facilities groups would have a less-than-significant impact on wastewater treatment capacity and facilities. The Waterfront Trail and the City-wide Creeks group would have no impact on wastewater.

(4) Require or result in construction of new stormwater drainage facilities. Components of the Lake Merritt and Lake Merritt Channel and City-wide Creek groups would not cause a net increase in the area of impervious surfaces and thus would not require the construction of new stormwater drainage facilities to handle increased stormwater flows. Some project components, such as the 12th Street Reconstruction, would reconfigure the existing stormwater drains as part of the project but would reduce overall stormwater flows to the stormdrain system due to the reduced size of the streets and other impervious materials in the area. The Waterfront Trail components are located in areas that are already developed and the creation of new trails in these areas would not substantially increase stormwater flows. In addition, because the trail is adjacent to the Oakland Inner Harbor Channel, most stormwater leaves the area as sheetflow. The renovation of Studio One Art Center would not increase the impervious surface area at the facility. The East Oakland Sports Complex would create some new impervious surfaces but would use treatment techniques to detain and treat stormwater on site as required by NPDES (see Section IV.H, Hydrology and Water Quality).

Implementation of the proposed project components would not require the construction of new storm drain facilities or the expansion of existing facilities. The proposed Recreational Facilities group would have a less-than-significant impact on stormwater drainage facilities. The Lake Merritt and Lake Merritt Channel, Waterfront Trail, and the City-wide Creeks groups would have no impact on stormwater.

(5) Be served by a landfill with insufficient permitted capacity. Measure DD Implementation Project components would not generate significant amounts of solid waste. The

[19] Ibid.

additional solid waste generated from the use of existing parks and facilities and the construction of new facilities, such as the East Oakland Sports Complex and the Waterfront Trail, and the renovation of existing facilities, such as Children's Fairyland theatre pavilion and Studio One Art Center, would not be substantial.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, Recreational Facilities, and the City-wide Creeks groups would not require the construction or expansion of landfill facilities; therefore, the proposed project would have a less-than-significant impact on solid waste facilities.

(6) Violate applicable regulations related to solid waste. Construction activities associated with the project components, including the removal of existing hardscape along restored creeks, removal of culverts including the 10th and 12th Street culverts, and redesign of surface parking areas, would be subject to City of Oakland requirements for waste reduction and recycling. Compliance with Oakland Municipal Code Chapter 15.34 requiring implementation of a Recycling and Waste Reduction Plan for construction and demolition activities would reduce the amount of waste generated during the construction phase of the projects. As part of construction, contaminated soils may be removed from properties in need of remediation along the waterfront. Such soils would be disposed of in an approved landfill facility. This issue is discussed in Section IV.J., Hazards and Hazardous Materials.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, Recreational Facilities, and the City-wide Creeks groups would not violate applicable federal, State, and local statues and regulations; therefore, the proposed project would have a less-than-significant impact on solid waste facilities.

(7) Violate applicable regulations relating to energy standards. Measure DD Implementation Project components would be subject to Title 24, California's Energy Efficiency Standards for Residential and Nonresidential Buildings and would not violate applicable regulations related to energy standards.

The proposed Lake Merritt and Lake Merritt Channel and Recreational Facilities would have a less-than-significant impact on energy. The Waterfront Trail and the City-wide Creeks groups would have no impact on energy.

(8) Result in a determination by the energy provider which serves the project that it does not have adequate capacity. Measure DD Implementation Project components that would require electrical and natural gas services are located in areas already served by PG&E. Connecting new construction to existing lines would involve relatively minor improvements. Energy consumption would be primarily associated with the new East Oakland Sports Complex facilities, existing and renovated buildings including the Children's Fairyland, Studio One, Boathouse, Sailboat House, and trail lighting (existing and proposed). The project components would not require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities would have a less-than-significant impact on energy. The City-wide Creeks groups would have no impact on energy.

c. Impacts and Mitigation Measures Unique to Specific Project Components. There are no component-specific impacts associated with utilities and infrastructure.

L. UTILITIES AND INFRASTRUCTURE

This section describes major utilities and infrastructure serving the Measure DD Implementation Project area and evaluates the effects of the proposed project components on utilities and existing infrastructure. Potential impacts to infrastructure and utilities that would result from implementation of the proposed project are identified, and mitigation measures are recommended, as appropriate.

1. Setting

The following infrastructure and utility systems are described and analyzed in this section: water, wastewater, stormwater, solid waste, and energy.

a. Water. The project sites are located in areas served by existing water supplies, treatment facilities, and distribution systems, which are operated and managed by the East Bay Municipal Utility District (EBMUD) as described below.

(1) Water Supply. EBMUD provides potable water to approximately 1.3 million people throughout portions of Alameda and Contra Costa counties, including the City of Oakland. EBMUD obtains approximately 90 percent of its water from the Mokelumne River watershed, and transports it through pipe aqueducts to temporary storage reservoirs in the East Bay hills. EBMUD has water rights and facilities to divert up to a daily maximum of 325 million gallons per day (mgd) from the Mokelumne River.[1] However, this allocation may be constrained by: upstream water use by prior water right holders; downstream water use and other downstream obligations, including protection of public trust resources; drought, or less-than-normal rainfall for more than a year; and emergency outage.

The Mokelumne River can no longer meet EBMUD's projected customer demands during drought periods, even with 25 percent rationing imposed on total customer demand.[2] Average daily water demand within the EBMUD service area was 224 mgd in 2004.[3] This demand is adjusted for conservation and recycled water program savings. Demand is projected to increase to 258 mgd by 2010 and 277 mgd by 2020.[4]

EBMUD is actively involved in securing supplemental water supplies to meet customer demands during drought periods. In dry years, the Freeport Regional Water Project (FRWP) would deliver up to 100 mgd of water from the Sacramento River to EBMUD customers. The FRWP is anticipated to be in-service by 2009. Implementation of this and other water supply projects would reduce the potential for severe water rationing and associated economic losses during drought periods.

(2) Water Treatment Facilities. There are six water treatment plants in the EBMUD water supply and distribution system. Combined, the six plants have a treatment capacity of over 375 mgd.

[1] East Bay Municipal Utility District, 2005. *Draft Urban Water Management Plan 2005*. September.

[2] Ibid.

[3] East Bay Municipal Utility District, 2004. *Annual Report 2004*.

[4] East Bay Municipal Utility District, 2005. op. cit.

The Orinda and the Upper San Leandro Treatment Plants provide water to Oakland.[5] At the treatment plants, water is subjected to coagulation, filtration, and disinfection prior to being distributed to the public. The Orinda Water Treatment Plant has the largest output of EBMUD's treatment plants with a peak capacity of 200 mgd and is operating at approximately 21 percent capacity. The Upper San Leandro Treatment Plant has a capacity of 45 mgd and is operating at approximately 63 percent capacity.[6]

(3) Water Distribution Systems. Water distribution systems in Oakland are divided into pressures zones covering approximately 200-foot elevation ranges. As a result, water pressure ranges from 40 pounds per square inch (psi) to 130 psi. Water pressure is generally adequate throughout the City but pressure may be reduced in some locations with older water mains if they are not sized based on current standards or have lost capacity due to deterioration. Typically, required pipeline relocations and extensions, in addition to other water distribution infrastructure improvements, are made at the expense of the Project applicant in consultation with EBMUD's New Business Office.

b. Wastewater System. The project sites are located in areas served by existing wastewater treatment facilities and collection systems operated and managed by EBMUD.

(1) Wastewater Treatment Facility. EBMUD provides wastewater services to approximately 642,000 people in Alameda and Contra Costa counties.[7] Wastewater collected by interceptors in the EBMUD service area Special District No. 1, which includes the City of Oakland, flows to the Main Wastewater Treatment Plant (MWWTP), which is located in Oakland near the eastern entrance of the San Francisco-Oakland Bay Bridge. Additionally, EBMUD has two wet weather wastewater treatment facilities (WWF) in Oakland, the San Antonio Creek WWF and the Oakport WWF.

The MWWTP provides both primary and secondary treatment of wastewater. Primary treatment involves the removal of floating materials, oils and greases, sand and silt, and organic solids sufficiently heavy to settle in water. Secondary treatment involves the removal of suspended organic and chemical impurities. The MWWTP has a primary treatment capacity of 320 mgd and a secondary treatment capacity of 168 mgd. Storage basins provide plant capacity for a short-term hydraulic peak of 415 mgd. The average annual daily flow into the MWWTP is approximately 80 mgd, representing 48 percent of the plant's secondary treatment capacity.[8] Treated effluent is disinfected, dechlorinated, and discharged through a deep-water outfall one mile off the East Bay shoreline into San Francisco Bay.

In addition, EBMUD has been recycling water at its main wastewater treatment facility since the early 1970s. Recycled water is suitable for land uses that do not require potable water sources, such as

[5] East Bay Municipal Utility District, 2005. *2005 Water Quality Report*. Website:: www.ebmud.com/-water_&_environment/water_quality/annual_report/ebmud_wqr_2005.pdf.

[6] East Bay Municipal Utility District, 2006. *Daily Water Supply Report*. Website: www.ebmud.com-/water_&_environment/water_quality/water_treatment_plants/. February 27.

[7] East Bay Municipal Utility District, 2005. op. cit.

[8] East Bay Municipal Utility District, 2005. Wastewater Treatment. http://www.ebmud.com/wastewater/treatment/. August 23.

golf courses, some agricultural areas, and industrial uses. EBMUD provided more than 8 mgd of recycled water to customers in 2004 and has a goal to recycle 14 mgd by 2020.[9] Incentives used by EBMUD to encourage customers to utilize recycled water include rate discounts on recycled water and low-interest loans used to retrofit buildings so that they can accommodate recycled water.

In January 2002, the City adopted a dual plumbing ordinance, which requires new development to use recycled water provided by EBMUD, and to install a dual plumbing system if recycled water is anticipated to be available. The multi-phased East Bayshore Recycled Water Project will supply up to 2.5 mgd of recycled water to portions of Alameda, Albany, Berkeley, Emeryville, and Oakland. Recycled water use is not planned in the Grand Avenue-Lakeside Park area, although it is available in the 12th Street shoreline park area.

(2) Wastewater Collection System. EBMUD wastewater interceptors consist of 29 miles of reinforced concrete pipes ranging from 1 to 9 feet in diameter. The City owns and maintains the sewer collection system within Oakland, including the project areas. Most of the City's wastewater collection system is 50 years old and some of the existing infrastructure is as old as 100 years.

The City of Oakland's infiltration/inflow correction program consists of a 25-year capital improvement program to rehabilitate the existing system in cost-effective areas and add capacity where needed. This program anticipates a 20 percent growth rate throughout Oakland. Mitigation fees are assessed to all new development or redevelopment in sub-basins that have a growth rate greater than 20 percent. This fee represents the development's pro-rata share of the improvements identified by the 25-year plan in anticipation of the greater-than-20 percent development.

c. Stormwater. The Alameda County Flood Control District was created in 1949 by the State Legislature to provide flood control services to Alameda County. The District's flood control infrastructure includes hundreds of miles of pipelines, channels, creeks, erosion control measures and pump stations. The City of Oakland is within Zone 12, which also includes the City of Emeryville, and is the largest of the District's zones. Zone 12 has approximately 50 miles of closed conduit, approximately 10 miles of earthen and concrete channels, as well as the existing natural waterways, which move stormwater to the San Francisco Bay.[10] Four pump stations lift stormwater to the Bay (Lake Merritt, Ettie, McKillop, and Temescal).

Recent Flood Control District projects include: modifying Lake Merritt Pump Station for increased channel flow and ease of maintenance; repairs to Glen Echo Creek (Line B); $7.8 million upgrades to Trestle Glen Creek (line D) and Line D-1 in the Lake Merritt area; restoration of Sausal Creek, Peralta Creek and Arrojo Viejo Creek; realignment of Lions Creek (Line J); repair of pump 4 at Ettie Street Pump Station; coordinating restoration designs for Peralta Creek (Line F). Fiscal Year 2006 projects planned for Zone 12 include: Pump 3 rehabilitation at the Ettie Street Pump Station; restoration and gate reconstruction on Lion Creek (Line J); and rehabilitation of Lake Merritt Pump Station.

[9] East Bay Municipal Utility District, 2005. op. cit.

[10] Alameda County Flood Control and Water Conservation District, 2005. *Report to the Community, Fiscal Year 2005*.

The City of Oakland's storm drainage system consists of more than 300 miles of storm drainpipes and 15,000 structures (mostly inlets, manholes, and catch basins). The storm drain system is a network of disjointed private and public drainage ways. City-owned drainage systems are improved drainage facilities located within easements and rights-of-way.[11] Existing stormwater drainage systems serve the project areas.

d. Solid Waste. Solid waste and yard trimmings within the City of Oakland are collected by Waste Management of Alameda County. These materials are taken to the Davis Street Transfer Center in San Leandro. The Transfer Center, which has a maximum allowable capacity of 5,600 tons of waste per day, received an average of 3,028 tons per day in 2003.[12] The facility can process up to 320 tons per day of concrete, asphalt, dirt, bricks, wood, and metal. After undergoing processing, waste from the Transfer Station is delivered to the Altamount Landfill in eastern Alameda County. The landfill comprises approximately 2,170 acres (480 acres of permitted landfill area) and has a permitted maximum daily disposal of 11,150 tons per day and an average input of 7,505 tons per day. The landfill is projected to have sufficient capacity to operate until at least 2031 and potential to operate through 2071, depending on waste flows and waste reduction measures.[13]

In 1989, the California Legislature enacted the California Integrated Waste Management Act (AB 939), which requires the diversion of waste materials from landfills in order to preserve the decreasing capacity of landfills. Cities and counties in California were required to divert 25 percent of solid waste by 1995, and 50 percent of solid waste by the year 2000. The City of Oakland met this requirement by diverting 50 percent or greater of its waste from 2000 through 2004.[14,15] AB 939 further requires every city and county to prepare two documents demonstrating how the mandated rates of diversion will be achieved. The *Source Reduction and Recycling Element* describes the chief source of the jurisdiction's waste, the existing diversion programs, and current rates of waste diversion and new or expanded diversion programs. The *Household Hazardous Waste Element* describes each jurisdiction's responsibility in ensuring that household hazardous wastes are not mixed with non-hazardous solid wastes and subsequently deposited at a landfill. Oakland's *Source Reduction and Recycling Element* and its *Household Hazardous Waste Element* were approved in 1995 by the California Integrated Waste Management Board.[16]

The City provides curbside recycling within the City, including the project sites. Curbside recycling includes the following materials: glass, aluminum and tin, motor oil, cardboard, magazines and newsprint, and plastic. Recyclable materials are delivered to the Davis Street Transfer Center where they are processed.

[11] City of Oakland, 2004. *Public Works Agency Standards, Storm Drainage Design Guidelines*, November.

[12] Alameda County Waste Management Authority, 2003. *Alameda County Integrated Waste Management Plan.* February 26.

[13] Ibid.

[14] California Integrated Waste Management Board, 2005. *Jurisdiction Profile for City of Oakland, Waste Stream Information Profiles*. www.ciwmb.ca.gov/profiles/.

[15] Data not available online for subsequent years.

[16] California Integrated Waste Management Board, 2005. op. cit.

Oakland Municipal Code Chapter 15.34 requires building permit applications for new construction, demolition, or alterations and additions (with a valuation of $50,000 or greater) to be accompanied by an approved Waste Reduction and Recycling Plan (WRRP). The WRRP is required to document the ways that the applicant will reduce the quantity of construction and demolition debris disposed at landfills by 50 percent or more. The City does not approve building permits for projects until the WRRP is approved.

e. Energy. The Pacific Gas & Electric Company (PG&E) provides electricity and natural gas service to the City of Oakland, including the Measure DD Implementation Project component sites. Most of Oakland's electrical power is delivered via 12-kilovolt (kV) transmission lines from PG&E Substation L. Substation L receives 155 kV and distributes power to upper downtown Oakland and West Oakland. Local electric and gas distribution lines are located within the project sites. PG&E charges connection and user fees for all new development in addition to sliding rates for electrical and natural gas service based on use. These services are currently available at the project sites.

Title 24, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, details requirements to achieve minimum energy efficiency standards of the State of California. The standards apply to new construction of both residential and nonresidential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating and lighting. Compliance with these standards is verified and enforced through the local building permit process.

f. City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential utilities and infrastructure impacts would be reduced.

> **Condition 26: Waste Reduction and Recycling.** The project applicant will submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Public Works Agency.
>
> *Prior to issuance of demolition, grading, or building permit*
> Chapter 15.34 of the Oakland Municipal Code outlines requirements for reducing waste and optimizing construction and demolition (C&D) recycling. Affected projects include all new construction, renovations/alterations/modifications with construction values of $50,000 or more (except R-3), and all demolition (including soft demo).The WRRP must specify the methods by which the development will divert C&D debris waste generated by the proposed project from landfill disposal in accordance with current City requirements. Current standards, FAQs, and forms are available at **www.oaklandpw.com/Page39.aspx** or in the Green Building Resource Center. After approval of the plan, the project applicant shall implement the plan.
>
> *Ongoing*
> The ODP will identify how the project complies with the Recycling Space Allocation Ordinance, (Chapter 17.118 of the Oakland Municipal Code), including capacity calculations, and specify the methods by which the development will meet the current diversion of solid waste generated by operation of the proposed project from landfill disposal in accordance with current City requirements. The proposed program shall be in implemented and maintained for the duration of the proposed activity or facility. Changes to the plan may be re-submitted to the Environmental Services Division of the Public Works Agency for review and approval. Any incentive programs shall remain fully operational as long as residents and businesses exist at the project site.
>
> **Condition 77: Storm Water and Sewer.** Confirmation of the capacity of the City's surrounding storm water and sanitary sewer system and state of repair shall be completed by a qualified civil engineer with funding from the project applicant. The project applicant shall be responsible for the necessary stormwater and sanitary sewer infrastructure improvements to accommodate the proposed project. In addition, the applicant shall be required to pay additional fees

to improve sanitary sewer infrastructure if required by the City. Improvements to the existing sanitary sewer collection system shall specifically include, but are not limited to, mechanisms to control or minimize increases in infiltration/inflow to offset sanitary sewer increases associated with the proposed project. To the maximum extent practicable, the applicant will be required to implement Best Management Practices to reduce the peak stormwater runoff from the project site. Additionally, the project applicant shall be responsible for payment of the required installation or hook-up fees to the affected service providers.

2. Impacts and Mitigation Measures

This section discusses potential impacts to infrastructure and utility systems that could result from implementation of Measure DD. The section begins with the criteria of significance, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents the impacts associated with the proposed projects and identifies mitigation measures, if appropriate. Stormwater and storm drain-related impacts are discussed in Section IV.H, Hydrology and Water Quality.

a. Criteria of Significance. The Measure DD Implementation Project would have a significant impact on the City's infrastructure and utility systems if it would:

1) Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

2) Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board;

3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

4) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

5) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects;

6) Violate applicable federal, State, and local statutes and regulations related to solid waste;

7) Violate applicable federal, State and local statutes and regulations relating to energy standards; or

8) Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The level of impact to utilities and infrastructure is discussed in the following section and summarized in Table IV.L-1.

Table IV.L-1: Summary of Potential Impacts – Utilities and Infrastructure

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	O	O	==
2) Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board?	O	==	O	==
3) Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	==	O	==
4) Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	==	==	O	==
5) Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	O	O	O
6) Violate applicable federal, State, and local statutes and regulations related to solid waste?	O	O	O	O
7) Violate applicable federal, State and local statutes and regulations relating to energy standards?	O	==	O	==
8) Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects?	O	==	O	==

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact and the proposed mitigation measure, if any, are identified as follows:

== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
UTL-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, 2007

b. Impacts and Mitigation Measures Applicable to all Project Components. The potential utilities and infrastructure impacts that could result from implementation of Measure DD would be essentially the same for each of the four project groups, as described below.

(1) Exceed water supplies available to serve the project. Some Measure DD Implementation Project components would incrementally increase demand for water supply. A small increase in water consumption could result from irrigation of new parkland and new park facilities (replacement of existing irrigation in many areas would not create additional demand). The East Oakland Sports Complex, an approximately 150,000-square foot addition (including a 50-meter pool and activity pool) to the existing Ira Jinkins Park/Recreation Center with a maximum occupancy of 4,870 persons, has the largest potential water demand of the proposed projects. The East Oakland Sports Complex addition could result in additional demand of 0.08 mgd.[17]

The Municipal Boathouse renovation (including a restaurant, café, and meeting room) might cause a small increase in water usage over the previous use of the site as office space. Renovations of existing facilities, such as the Studio One Art Center, Children's Fairyland and the Sailboat House are not expected to increase use of existing water services, nor would restoration and acquisition activities associated with the City-wide Creeks group. While completion of the Waterfront Trail may increase visitors to waterfront parks this usage would not create a significant demand for water supply services. The incremental increase in water use would not exceed water supplies available to serve the project from existing entitlements.

In compliance with the City of Oakland's dual plumbing ordinance, new development projects would install a dual plumbing system if recycled water will be available from EBMUD. Recycled water will be available in the 12th Street and the Lake Merritt Channel area by mid 2007.[18] For project components in this area, the City would coordinate with EBMUD regarding the installation of separate plumbing systems for recycled water use in landscape irrigation.

The adequacy of existing water mains to accommodate increased demand generated by the East Oakland Sports Complex would be assessed at the time funding is allocated to the project. If line improvements are required due to the age and condition of the existing lines, upgrades would be made during the project construction period and would not be anticipated to result in significant environmental impacts. Additionally, minimum fire flow requirements (for the purpose of fighting fires) would be assessed at the time of project funding. Typically, fire flow requirements are 2,500 gpm for residential uses, and 3,500 gpm for commercial uses.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities groups would have a less-than-significant impact on water supplies and water facilities. The City-wide Creeks group would have no impact on water supplies.

(2) Exceed wastewater treatment requirements. None of the project components would generate wastewater that would cause wastewater treatment requirements to be exceeded.

[17] Prasifka, David, 1994. *Water Supply Planning*. Table 1-6, Summary of Commercial and Institutional Water use.

[18] Kirkpatrick, William, 2006. Comments on the Notice of Preparation of a Draft Environmental Impact Report for Measure DD Projects. Written communication to Elois Thornton, Community and Economic Development Agency, Oakland. December 29.

(3) Exceed wastewater treatment capacity. Most components of the Measure DD Implementation Project, such as park improvements, creek restorations and completion of trail gaps, would not generate wastewater. The project component with the most intensive production of wastewater would be the East Oakland Sports Complex which may generate 0.064 mgd. A small amount of additional demand would be generated by the Municipal Boathouse renovation, which would convert former office space to a restaurant, café, and meeting room. These project components would be located in areas served by existing sewer pipelines and would not require the construction of new wastewater lines.

Wastewater generated by the Measure DD Implementation Project components represents less than 0.1 percent of the MWWTP's secondary treatment capacity. This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater processed by EBMUD's Main Wastewater Treatment Plant. EBMUD has sufficient capacity to treat wastewater flows from the projects during dry weather[19] and would not require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The proposed Lake Merritt and Lake Merritt Channel and the Recreational Facilities groups would have a less-than-significant impact on wastewater treatment capacity and facilities. The Waterfront Trail and the City-wide Creeks group would have no impact on wastewater.

(4) Require or result in construction of new stormwater drainage facilities. Components of the Lake Merritt and Lake Merritt Channel and City-wide Creek groups would not cause a net increase in the area of impervious surfaces and thus would not require the construction of new stormwater drainage facilities to handle increased stormwater flows. Some project components, such as the 12th Street Reconstruction, would reconfigure the existing stormwater drains as part of the project but would reduce overall stormwater flows to the stormdrain system due to the reduced size of the streets and other impervious materials in the area. The Waterfront Trail components are located in areas that are already developed and the creation of new trails in these areas would not substantially increase stormwater flows. In addition, because the trail is adjacent to the Oakland Inner Harbor Channel, most stormwater leaves the area as sheetflow. The renovation of Studio One Art Center would not increase the impervious surface area at the facility. The East Oakland Sports Complex would create some new impervious surfaces but would use treatment techniques to detain and treat stormwater on site as required by NPDES (see Section IV.H, Hydrology and Water Quality).

Implementation of the proposed project components would not require the construction of new storm drain facilities or the expansion of existing facilities. The proposed Recreational Facilities group would have a less-than-significant impact on stormwater drainage facilities. The Lake Merritt and Lake Merritt Channel, Waterfront Trail, and the City-wide Creeks groups would have no impact on stormwater.

(5) Be served by a landfill with insufficient permitted capacity. Measure DD Implementation Project components would not generate significant amounts of solid waste. The

[19] Ibid.

additional solid waste generated from the use of existing parks and facilities and the construction of new facilities, such as the East Oakland Sports Complex and the Waterfront Trail, and the renovation of existing facilities, such as Children's Fairyland theatre pavilion and Studio One Art Center, would not be substantial.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, Recreational Facilities, and the City-wide Creeks groups would not require the construction or expansion of landfill facilities; therefore, the proposed project would have a less-than-significant impact on solid waste facilities.

(6) Violate applicable regulations related to solid waste. Construction activities associated with the project components, including the removal of existing hardscape along restored creeks, removal of culverts including the 10th and 12th Street culverts, and redesign of surface parking areas, would be subject to City of Oakland requirements for waste reduction and recycling. Compliance with Oakland Municipal Code Chapter 15.34 requiring implementation of a Recycling and Waste Reduction Plan for construction and demolition activities would reduce the amount of waste generated during the construction phase of the projects. As part of construction, contaminated soils may be removed from properties in need of remediation along the waterfront. Such soils would be disposed of in an approved landfill facility. This issue is discussed in Section IV.J., Hazards and Hazardous Materials.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, Recreational Facilities, and the City-wide Creeks groups would not violate applicable federal, State, and local statues and regulations; therefore, the proposed project would have a less-than-significant impact on solid waste facilities.

(7) Violate applicable regulations relating to energy standards. Measure DD Implementation Project components would be subject to Title 24, California's Energy Efficiency Standards for Residential and Nonresidential Buildings and would not violate applicable regulations related to energy standards.

The proposed Lake Merritt and Lake Merritt Channel and Recreational Facilities would have a less-than-significant impact on energy. The Waterfront Trail and the City-wide Creeks groups would have no impact on energy.

(8) Result in a determination by the energy provider which serves the project that it does not have adequate capacity. Measure DD Implementation Project components that would require electrical and natural gas services are located in areas already served by PG&E. Connecting new construction to existing lines would involve relatively minor improvements. Energy consumption would be primarily associated with the new East Oakland Sports Complex facilities, existing and renovated buildings including the Children's Fairyland, Studio One, Boathouse, Sailboat House, and trail lighting (existing and proposed). The project components would not require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

The proposed Lake Merritt and Lake Merritt Channel, Waterfront Trail, and Recreational Facilities would have a less-than-significant impact on energy. The City-wide Creeks groups would have no impact on energy.

c. Impacts and Mitigation Measures Unique to Specific Project Components. There are no component-specific impacts associated with utilities and infrastructure.

M. AESTHETIC RESOURCES

This section describes existing aesthetic resources in and around the sites affected by the Measure DD Implementation Project and discusses the visual resources policies that are applicable to the proposed project. The section concludes with a discussion of potential impacts of the project on visual resources and the consistency of the project with applicable visual resources policies.

The aesthetics analysis is based on a site reconnaissance, a review of aerial photographs of the Measure DD Implementation Project component sites, and visual simulations completed for a few key project components.

1. Setting

The Measure DD Implementation Project site comprises numerous individual sites around Oakland, ranging from formal parks, parkways, and landscaping, to the waters of Lake Merritt, the shoreline of the Oakland Estuary, and numerous creek sites throughout the City. As such, the project site contains a diversity of visual characteristics. The key aesthetic characteristics, including adverse visual qualities, of each of the four groups are described below. However, the groups are generally united in that they offer places to see and experience the interface where "natural communities" (including ones that have been highly manipulated by human activity) meet the urban environment. While the project component sites offer varying degrees of intact animal and plant communities, they offer users the ability to see basic natural elements in the context of urban places. The quality of this visual experience, even in the built environment, is very much dependent on the ecological integrity of the natural communities themselves.

a. Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and its associated channel are visual elements that are central to the identity of Oakland. The Lake and its surrounding parkland offer the visual qualities of open space in close proximity to the dense population and employment center of Downtown Oakland and the apartment buildings and medium-density residential and commercial neighborhoods that ring the Lake. The sunlight and unblocked views that Lake Merritt offers to residents and workers in many parts of central Oakland are important visual benefits of this large area of open space.

The carefully planned views of public buildings around Lake Merritt evoke City Beautiful planning motifs.

Lake Merritt, which is a scenic resource in Oakland, constitutes a semi-formal landscape that harkens back to the English landscape garden movement of the 1700s and 1800s and the City Beautiful movement in the United States of the late 1800s and early 1900s. These movements valued expanses of mowed grass with clumps of carefully-pruned trees, dramatic vistas, boulevards running through parks, and distinct public buildings. Thus Lake Merritt's visual qualities are characterized

by broad, grassy areas adjacent to streets, walkways adjacent to the water, and distinguished public and semi-public buildings and monuments (e.g., Pergola, Cleveland Cascade, and Boathouse). Lake Merritt Channel is bordered by pedestrian walkways that offer expansive views of surrounding areas.

The ecological workings of the Lake are also key visual elements of the area, especially considering that the site was designated as a wildlife refuge to protect ducks in 1869. The quality of the water, and the use of water bodies by wildlife (especially waterfowl) are important aspects of the Lake and Channel visual qualities.

However, the quality of certain visual aspects of Lake Merritt and Lake Merritt Channel has been reduced by urban change. Some roadways around the Lake, including those of the 12th Street overpass, Interstate 580, and Lakeside Drive, are out-of-proportion to the pedestrian-scale open space areas around the water body. In addition, some of the visual qualities of Lake Merritt's natural communities have suffered from water quality degradation (caused by reduced tidal flow into and out of the Lake and insufficient aeration), the loss of tidal marsh, and landscaping that is in poor condition. These factors all detract from the generally high-quality visual characteristics of Lake Merritt and Lake Merritt Channel.

b. Waterfront Trail (Group 2). The Oakland Waterfront Trail group sites comprise a 6.6-mile strip of Oakland Estuary shoreline between Jack London Square and 66th Avenue and include a varied assortment of land uses ranging from recreational facilities (e.g., existing trails and parks) to residential neighborhoods and industrial uses. These varying land uses exert a direct influence of the visual character of the area. In places, such as at Union Point Park, the shoreline is a completely formalized environment, with a dedicated brick walkway, regularly-spaced trees and benches, and a guardrail adjacent to the water. These areas, where portions of the Bay Trail have already been completed, are characterized by a park-like visual quality. Along the Martin Luther King Junior Regional Shoreline, relatively intact tidal marsh lends the area a high visual quality and provides expansive views to the west and south. In other places, such as at Brooklyn Basin and the Cryer site, the shoreline has a raw, unfinished, and industrial quality characterized by torn up pavement, chain-link fencing, disturbed ground, and ruderal vegetation.

Much of the shoreline in the project site has been shaped by past industrial uses and is colonized by non-native plant species.

However, even in industrial landscapes such as those at Brooklyn Basin, remnants of estuary vegetation appear to remain, and these vestiges of the native ecosystem add substantially to the visual quality of the area. In still other areas, such as at Livingston Pier, port activities are visible, and the shoreline has a working, active (during certain portions of the day) visual character. In almost all portions of the

shoreline, expansive views of surrounding areas are available. These views encompass the shoreline of Alameda, Coast Guard Island, aircraft flying into Oakland International Airport, and, in select places, the skyscrapers of Downtown Oakland.

While much of the shoreline in the project area has high visual quality, aesthetic value in certain areas is reduced by the presence of garbage or deteriorating trail surfaces and landscaping. Even more important from a visual perspective is that many portions of the shoreline have inadequate public access, which restricts visual access into the Estuary and surrounding areas. High chain link fences (e.g., along Alameda Avenue), the lack of public access points, the presence of contamination, and the segmentation of the existing trail by bridges (e.g., High Street) all impede the public's ability to see into the Estuary (and reduce the visual quality of the shoreline).

c. Recreational Facilities (Group 3). The North and East Oakland Recreational Facilities group of projects involves two sites: Studio One Art Center (a studio arts center in North Oakland) and the existing Ira Jinkins Park/Recreational Center (in East Oakland). Studio One and Ira Jinkins Park have significantly different visual characteristics.

Studio One is a 22,000-square foot building that is visually characterized by its historic façade and interior. The building, which would be considered a scenic resource, was originally constructed in 1894 (although it was rebuilt after the 1906 earthquake/fire). The structure's key features (including the brick first story; long, multi-part rectangular windows; sloping roofs; and courtyard layout) provide it with a distinct visual character that distinguishes it from surrounding buildings and adjacent residential neighborhoods. The visual quality of the interior is characterized by sunlit studio rooms and galleries and a non-institutional atmosphere.

Ira Jinkins Park/Recreational Center is located in a neighborhood with a mixture of land uses, including light industrial/service uses (a Federal Express delivery center), a school, and a major transportation corridor (Interstate 880). The visual quality of the site is characterized by this mix of surrounding land uses; I-880 dominates the view to the south and west of the site. The park itself comprises playing fields and a small recreational center, and has an exposed visual character (the flat asphalt parking and playing areas associated with the school adds to this effect).

d. City-Wide Creeks (Group 4). Oakland creeks in the project site range from open air drainages with some intact riparian vegetation to culverted waterways with little or no habitat value. However, all the waterways – even the ones that are still above ground – have been subject to environmental degradation due to the effects of surrounding urbanization, including historic attempts to enable creeks to convey larger volumes of runoff while at the same time reducing flooding hazards. The net effects of creek channelization/straightening and the intensification of watershed urbanization are higher peak flows, increased erosion, removal of riparian vegetation, reduced water quality, and the need for additional bank stabilization and support. Creeks that exhibit these conditions generally have a lower visual quality than those waterways that have retained their natural form and function. The creek sites that would be subject to Measure DD restoration efforts are characterized by the visual qualities that are typical of disturbed/engineered waterways and urban watersheds.

Several of the creeks in the project site have been culverted and placed underground, including Sausal Creek at Hawthorne School, Glen Echo Creek at Mosswood Park, and Palo Seco Creek at Joaquin Miller Park. These creeks, which are not visible, have no current visual value as waterways (although

these areas have current value as open space). San Leandro Creek at Sobrante Park is characterized by a concrete channel and a lack of bank-side vegetation, and has greatly diminished natural visual quality. Arroyo Viejo at Knowland Park is daylighted but the visual character suffers from unstable banks and the presence of non-native vegetation. Changes to creek channels, especially erosion along creek banks, also effects visual quality by reducing creek access (and reducing opportunities to view creeks and surrounding vegetation and wildlife). Such is the case at Arroyo Viejo. The accumulation of trash and poor maintenance also reduces the visual quality of certain creeks, such as Coliseum Slough, where garbage has accumulated at the mouths of Lion Creek and Arroyo Viejo.

e. Scenic Views and Features. The City of Oakland General Plan, which is discussed below in more detail, does not contain a graphic depicting designated scenic viewsheds or views. In addition, no "vista points" along the portion of the project site comprising the Estuary shoreline are designated in the San Francisco Bay Plan. However, for the purposes of the visual resources analysis in this Draft EIR, numerous views from and of the Measure DD Implementation Project sites are considered significant scenic views. These include views of: Lake Merritt and Lake Merritt Channel; Downtown Oakland; the East Bay Hills; the Oakland Estuary; and adjacent landscape features, including Alameda and Coast Guard Island. In addition, Interstate 580 between the northern City of San Leandro border and State Route 24 is an officially designated State Scenic Highway.[1] Scenic resources include the above-listed landscape elements themselves (e.g., Lake Merritt) in addition to significant historic structures (e.g., Cleveland Cascade and Studio One).

Unobstructed views of Downtown Oakland are available across Lake Merritt.

f. Applicable Policies. Visual resources in the project site are primarily governed by policies from the following documents, which are discussed below: 1) San Francisco Bay Plan; 2) Estuary Policy Plan; 3) Land Use and Transportation Element (LUTE); and 4) City of Oakland Open Space, Conservation, and Recreation Element (OSCAR).

San Francisco Bay Plan. The San Francisco Bay Plan (Bay Plan) particularly pertains to the Lake Merritt and Lake Merritt Channel and Waterfront Trail groups of the proposed project. The Bay Plan provides numerous visual resources policies; the ones below are applicable to the proposed project.

- Appearance, Design, and Scenic Views Policy 1. To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.
- Appearance, Design, and Scenic Views Policy 2. All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of

[1] California Department of Transportation, 2007. State Scenic Highway Mapping System. Website: www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm. February 25.

waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects working in conjunction with engineers and professionals in other fields.

- Appearance, Design, and Scenic Views Policy 4. Structures and facilities that do not take advantage of and visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.
- Appearance, Design, and Scenic Views Policy 9. "Unnatural" debris should be removed from sloughs, marshes, and mudflats that are retained as part of the ecological system. Sloughs, marshes, and mudflats should be restored to their formal natural state if they have been despoiled by human activities.
- Appearance, Design, and Scenic Views Policy 13. Local governments should be encouraged to eliminate inappropriate shoreline uses and poor quality shoreline conditions by regulation and by public actions (including development financed wholly or partly by public funds). The Commission should assist in this regard to the maximum extent feasible by providing advice on Bay-related appearance and design issues, and by coordinating the activities of the various agencies that may be involved with projects affecting the Bay and its appearance.
- Appearance, Design, and Scenic Views Policy 14. Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).

Estuary Policy Plan. The Estuary Plan provides development policies for the Oakland Estuary shoreline, and covers an area extending from Adeline Street to 66th Avenue, including all the lands on the water side of I-880 within Port and City jurisdiction. One of the key goals of the Estuary Plan is to "Preserve and enhance the existing natural areas along the waterfront." The following visual resources objectives and policies are applicable to the proposed project:

- Objective SA-3: Emphasize visual corridors and open space links to surrounding inland areas.
- Objective SA-5: Enhance natural areas along the shoreline.
- Policy JL-9.1 (Jack London District): Improve existing shoreline access, open spaces, and connection between inland areas and the water.
- Policy JL-9.2 (Jack London District): Create new open spaces that expand the opportunities to view, appreciate, and enjoy the water's edge.
- Policy JL-9.3 (Jack London District): Maintain and enhance view corridors to the Estuary. Maintain the full width of existing view corridors, and establish additional view corridors.
- Policy OAK-10 (Oak to 9th District): Create a network of pedestrian-friendly streets that opens up views and access to the water.

Land Use and Transportation Element. The LUTE of the General Plan affects visual resources primarily by shaping broad-based land use patterns in the City. Applicable policies and objectives are listed below.

- Policy W2.6: Providing Maritime and Aviation Viewing Access. Safe access to areas for viewing maritime and aviation activities without interfering with seaport and airport activities should be encouraged.
- Policy W3.2: Enhancing the Quality of the Natural and Built Environment. The function, design and appearance, and supplementary characteristics of all uses, activities, and facilities should enhance, and should not detract from or damage the quality of, the overall natural and built environment along the waterfront.

- Policy W3.4: Preserving Views and Vistas. Buildings and facilities should respect scenic viewsheds and enhance opportunities for visual access of the waterfront and its activities.
- Policy W12.7: Defining Design Criteria (Fruitvale Waterfront Area of the Mixed-Use waterfront). Development in this area should be designed to enhance direct public access to and along the water's edge, maximize waterfront views and vistas, and make public pedestrian access and spaces inviting. Development and amenities must be sensitive to immediate surroundings.

Open Space, Conservation, and Recreation Element. This element promotes the preservation and good design of open space, and the protection of natural resources to improve aesthetic quality in Oakland. The following objectives and policies are relevant to visual resources concerns associated with the proposed project:

- Policy OS-2.5: Urban Park Acquisition Criteria. Increase the amount of urban parkland in the seven planning areas, placing a priority on land with the following characteristics (not in priority order): . . . (c) Land with visual or historic significance. . . (g) Land that is highly visible from major streets, or that is adjacent to existing public buildings, particularly police and fire stations.
- Objective OS-7: Shoreline Access. To increase physical and visual access to the Oakland shoreline and create new opportunities for shoreline recreation.
- Policy OS-7.3: Waterfront Preservation. Promote a greater appreciation of the Oakland waterfront by preserving and enhancing waterfront views, promoting its educational value, and exploring new and creative ways to provide public access to the shoreline without interfering with transportation and shipping operations or endangering public safety.
- Policy OS-9.2: Use of Natural Features to Define Communities. Use open space and natural features to define city and neighborhood edges and give communities within Oakland a stronger sense of identity. Maintain and enhance city edges, including the greenbelt on the eastern edge of the city, the shoreline, and San Leandro Creek. Use creeks, parks, and topographical features to help define neighborhood edges and create neighborhood focal points.
- Policy OS-9.3: Gateway Improvements. Enhance neighborhood and city identity by maintaining or creating gateways. Maintain view corridors and enhance the sense of arrival at the major entrances to the city, including freeways, BART lines, and the airport entry. Use public art, landscaping, and signage to create stronger City and neighborhood gateways.
- Objective OS-10: Scenic Resources. To protect scenic views and improve visual quality.
- Policy OS-10.1: View Protection. Protect the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland hills from the flatlands; (b) views of downtown and Lake Merritt; (c) views of the shoreline; and (d) panaoramic views from Skyline Boulevard, Grizzly Peak Road, and other hillside locations.
- Policy OS-10.2: Minimizing Adverse Visual Impacts. Encourage site planning for new development which minimizes adverse visual impacts and takes advantage of opportunities for new vistas and scenic enhancement.
- Policy OS-10.3: Underutilized Visual Resources. Enhance Oakland's underutilized visual resources, including the waterfront, creeks, San Leandro Bay, architecturally significant buildings or landmarks, and major thoroughfares.
- Policy OS-6.4: Lake Management. Manage Oakland's lakes to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. Discourage new recreational uses which impair the ability of lakes to support fish and wildlife. Support improvements which enhance water circulation, water quality, and habitat value, provided they are cost effective and are compatible with established recreational activities.

g. City of Oakland's Standard and Uniformly Applied Conditions of Approval. The City of Oakland's Standard and Uniformly Applied Conditions of Approval that would apply to the proposed project are listed below. Implementation of these Conditions of Approval would ensure that a project's potential aesthetic impacts would be reduced.

> **Condition 28: Lighting Plan.** *Prior to the issuance of an electrical or building permit.* The proposed lighting fixtures shall be adequately shielded to a point below the light bulb and reflector and that prevent unnecessary glare onto adjacent properties. All lighting shall be architecturally integrated into the site.

2. Impacts and Mitigation Measures

This subsection analyzes the environmental impacts related to aesthetics and visual resources that could result from implementation of the proposed project. The section begins with the criteria of significance, which establish the thresholds for determining whether an impact is significant. The latter part of this subsection presents the impacts associated with the proposed project, in addition to policy considerations related to visual issues.

a. Criteria of Significance. Implementation of the proposed project components would have a significant impact on aesthetics if they would:

1) Have a substantial adverse effect on a scenic vista;

2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State or locally designated scenic highway;

3) Substantially degrade the existing visual character or quality of the site and its surroundings; or

4) Create a new source of substantial light or glare which would substantially and adversely affect day or nighttime views in the area.

The level of land use impact is discussed in the following section and summarized in Table IV.M-1.

b. Impacts and Mitigation Measures Applicable to all Project Components. The following section includes a discussion of the impacts to aesthetic resources that would result from implementation of the proposed project components. The project components, which would generally benefit environmental quality and the appearance of open space in Oakland, would result in one significant impact aesthetic resources. Many of the individual projects would have beneficial effects on visual quality.

Figures IV.M-1 through IV.M-4 provide visual simulations of proposed changes to Lakeshore Avenue, El Embarcadero, and the Municipal Boathouse to illustrate some of the aesthetic changes that would result from implementation of the proposed project.

Table IV.M-1: Summary of Potential Impacts – Aesthetic Resources

	Project Group[a]			
Would the Project:	**Group 1 Lake Merritt**	**Group 2 Waterfront Trail**	**Group 3 Recreational Facilities**	**Group 4 City-wide Creeks**
1) Have a substantial adverse effect on a scenic vista?	O	O	O	O
2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state or locally designated scenic highway?	O	O	O	O
3) Substantially degrade the existing visual character or quality of the site and its surroundings?	O	O	O	O
4) Create a new source of substantial light or glare which would substantially and adversely affect day or nighttime views in the area?	O	O	O	==

[a] The Lake Merritt and Waterfront Trail groups are analyzed at the project level. The Recreational Facilities and City-wide Creeks groups are analyzed at the program level. The level of impact is identified as follows:
== No impact
O Less-than-Significant or Less-than-Significant with standard Conditions of Approval
O Reduced to Less-than-Significant after recommended mitigation
● Significant
NA Not Applicable
AES-1, etc. identifies the mitigation measure, if any, that addresses the impact and reduces it to a level that is less than significant.

Source: LSA Associates, Inc., 2007.

This discussion is organized according to the four criteria of significance listed above. Impacts that would result from each of the project groups are summarized below under each criterion.

(1) Have a Substantial Adverse Effect on a Scenic Vista. As noted in the setting section, neither the Oakland General Plan nor the San Francisco Bay Plan designates points or viewsheds in the project site as scenic vistas. However, for the purposes of this analysis, numerous views from and of the Measure DD Implementation Project sites are considered scenic views, including Lake Merritt, Lake Merritt Channel, Downtown Oakland, the East Bay Hills, and the Oakland Estuary and adjacent landscape features. The following discussion describes the impacts of each of the four project groups on scenic vistas.

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and the Lake Merritt Channel are resources that are part of scenic vistas seen from numerous locations in Oakland, including the City's Downtown and hillside areas. The proposed project would result in beneficial impacts to the visual quality of the Lake through water quality control measures, the restoration of historic buildings and monuments around the perimeter of the Lake, and enhanced landscaping. These changes to the Lake and the Channel would result in small but beneficial improvements to scenic vistas encompassing these waterways. The project would result in the removal of certain diseased trees from the vicinity of the Lake; however, the removal of these trees would not substantially change scenic vistas. New trees would be planted to replace the trees that are removed. No structures would be built that would block

Existing View

Proposed View (approx. 5 years)

LSA

FIGURE IV.M-1

Oakland Measure DD
Visual Simulation: Lakeshore Avenue
Variant A

SOURCE: WALLACE ROBERTS AND TODD, 2007.

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Existing View

Proposed View (approx. 5 years)

LSA

FIGURE IV.M-2

Oakland Measure DD
Visual Simulation: Lakeshore Avenue
Variant B

SOURCE: WALLACE ROBERTS AND TODD, 2007.

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Existing View

Proposed View (approx. 5 years)

LSA

FIGURE IV.M-3

Oakland Measure DD
Visual Simulation: El Embarcadero

SOURCE: WALLACE ROBERTS AND TODD, 2007.

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Existing View

Proposed View

LSA

FIGURE IV.M-4

Oakland Measure DD

Visual Simulation: Boathouse from South Side

SOURCE: CITY OF OAKLAND, 2007.

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surroundings and would not block scenic views of the Estuary. Therefore, this group of project components would have a less-than-significant impact on scenic vistas.

Recreational Facilities (Group 3). This project group involves the rehabilitation of Studio One and the construction of 150,000 square feet of additional recreational facilities at the existing Ira Jinkins Park/Recreation Center. The Studio One renovation involves the rehabilitation of the building's historic façade and changes to the structure's interior to enhance accessibility and functionality. These alterations would not adversely affect scenic vistas of the Oakland Hills that encompass the Studio One building. New construction at Ira Jinkins Park/Recreation Center would include buildings similar in scale to those that currently exist on the site (although the architectural design feature more modern elements). These structures would be generally low-slung and would not affect views of the East Bay Hills from Interstate 880. In addition, they would not block hill views of the Oakland Estuary and other portions of San Francisco Bay. Therefore, this group of project components would have a less-than-significant effect on scenic vistas.

City-Wide Creeks (Group 4). The creeks that are designated for restoration and ecological enhancements comprise portions of scenic vistas in Oakland, generally views of hillside areas (although some, including Coliseum Slough, would be visible from shoreline outlooks). The proposed project would enhance the ecological function of these creeks through native plant restoration, removal of artificial channels, and bank stabilization, and would not substantially affect scenic vistas that include these waterways. Therefore, this group of project components would have a less-than-significant effect on scenic vistas.

(2) Substantially Damage Scenic Resources, Including but not Limited to, Trees, Rock Outcroppings, and Historic Buildings Within a State or Locally Designated Scenic Highway. Interstate 580 from the northern boundary of San Leandro to State Route 24 is a State-designated Scenic Highway. Lake Merritt, in particular, is visible from I-580. Besides the Lake, other scenic resources in and adjacent to the project site include the Oakland Estuary and historic structures, such as the Pergola, Cleveland Cascade, Boathouse, and Studio One. The following discussion describes the impacts of each of the four project groups on scenic resources.

Lake Merritt and Lake Merritt Channel (Group 1). A key component of this group is the various proposed water quality control measures, including the installation of devices and features to clean and circulate water, and the creation of an open channel to allow for increased tidal flow into and out of the Lake. These measures, by improving water quality in the Lake, would enhance the scenic qualities of the waterway (including portions of the Lake visible from I-580), which suffers from algal blooms and stagnation associated with a surplus of nutrient-rich pollution. In addition, this group would involve the renovation of existing landscaping, which would improve the landscape context of the Lake. As part of the project, certain trees would be removed (and replaced with healthy individuals). Many of the trees that would be removed are diseased, short-lived, or are not stable. Although some of the trees that would be removed contribute to the scenic quality of the Lake, this contribution is not significant. Therefore, the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources. The project also includes the rehabilitation of three historic structures around Lake Merritt: the Pergola, Cleveland Cascade, and the Boathouse. This rehabilitation would be undertaken in a way that is sensitive to the historic qualities of the building facades and would enhance these scenic resources. Therefore, this group of project components would have a less-than-significant effect on scenic resources.

Waterfront Trail (Group 2). The Waterfront Trail group would involve environmental cleanup, trail, and park construction, and would generally have an effect on one scenic resource: the Oakland Estuary. These projects would generally benefit the visual setting of the Estuary through the planting of new native vegetation, the removal of trash and other pollution, and the creation of landscaped trails and public access points where these facilities do not currently exist. New public access points would increase the visibility of the scenic portions of the Oakland Estuary, which would benefit scenic resources in Oakland. Therefore, this group of project components would have a less-than-significant effect on scenic resources.

Recreational Facilities (Group 3). Studio One, which is a historic building constructed as a children's relief home in 1894, is itself a scenic resource. Implementation of the proposed project would result in rehabilitation of the structure and preservation of the historic qualities of the building's façade; minor landscape changes would also occur. Therefore, the project would enhance Studio One as a scenic resource. Ira Jinkins Park/Recreational Center is not a scenic resource and is not located in close proximity to a scenic resource, including distinguished trees. Therefore, this group of project components would not affect scenic resources at their respective sites.

City-Wide Creeks (Group 4). Creeks are important scenic resources in Oakland. Implementation of the proposed project would restore various targeted creek sites, where the ecological function of the waterways has been reduced by urbanization, channelization, encroachment by non-native vegetation, and bank failures. The proposed project would improve the environmental quality of the targeted creeks and would benefit the scenic qualities of these resources. Therefore, this group of project components would not affect scenic resources.

(3) Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings. As noted in the setting section, the visual quality of the various Measure DD Implementation Project sites ranges from degraded industrialized shorelines, to formal urban parks, and more naturalistic park sites throughout the City. The following discussion describes the impacts of each of the four project groups on visual character.

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and its surroundings are characterized by a semi-formal landscape of rolling lawns and walkways, all oriented around the water body itself. While the area has high visual quality, the aesthetics of the area are diminished primarily by low water quality in the Lake, landscaping and trees that are in poor condition, and roadways surrounding the Lake that are disproportionately wide and emphasize automobile traffic at the expense of the pedestrian environment. The proposed project would substantially improve these adverse conditions. First, the removal of the 12th Street culvert and the implementation of the various water quality control measures would improve the water quality of the Lake, and enhance the potential for the growth of native vegetation and use of the water body by native wildlife (besides Canada geese). Second, landscaping and trees in poor condition would be removed and replaced with new plants that would enhance the visual environment. Third, several roadways (including 12th Street, Lakeshore Avenue, and Lakeside Drive) would be reconfigured and/or narrowed to include bike lanes and pedestrian paths. These changes would reduce the visual intrusion of motor vehicles and would improve the visual environment for the bikers and walkers that comprise the key users of Lake Merritt. Lastly, historic buildings around the Lake, some of which are in poor condition, would be rehabilitated. At the Municipal Boathouse, two parking lots next to the Lake and Boathouse would be removed and replaced with landscaping, terraces, and pathways. A smaller parking lot would be

constructed closer to the road and the remaining parking would be relocated along Lakeside Drive itself. The improvement and preservation of historic structures, and the modification of parking areas would benefit the visual quality of the area, including the lakeshore itself. Therefore, the project group would have a less-than-significant impact on the existing visual character of the area surrounding the Lake and Lake Merritt Channel.

Waterfront Trail (Group 2). The visual character of the project shoreline area is diverse, and ranges from park-like to industrial. The Waterfront Trail group project components would be directed at extending the Bay Trail through a 6.6-mile portion of the shoreline, where select trail segments are already completed. In areas where there are gaps in the trail, a new pathway would be developed. The standard trail would comprise an 18-foot-wide asphalt path with an approximately 3-foot decomposed granite edge. Where appropriate, the trail would be landscaped. Path construction would involve minimal grading or other ground disturbance. The creation of a formal trail along portions of the shoreline that are currently trail-less would allow for enhanced public access to the shoreline, and would improve the visual quality of the area. The proposed project would also include the development of pocket parks at Derby Avenue and Lancaster Street, and decorative columns, a boardwalk, and native landscaping at the 66th Avenue Gateway. These changes to urban design in the area would also improve the visual quality of the shoreline. Therefore, the project group would have a less-than-significant impact on the existing visual character of the area along the Waterfront Trail.

Recreational Facilities (Group 3). The visual character of the Studio One site is currently dominated by the historic Studio One building itself. Implementation of the proposed project would result in the rehabilitation of this historic building and surrounding landscaping, which would improve the visual quality of the area. The Ira Jinkins Park/Recreation Center is currently characterized by expansive athletic fields and the mixture of land uses around the park, including a school, package shipping center, and housing. The proposed project would result in the expansion of recreational facilities on the site. These recreational facilities are expected to be compatible with existing facilities and the surrounding neighborhood, and would not adversely affect the visual quality of the area. Therefore, the project components would have a less-than-significant impact on the existing visual character of their respective sites.

City-Wide Creeks (Group 4). The aesthetic quality of the creek sites that would be targeted by the Measure DD Implementation Project generally has been diminished by the effects of urbanization and past engineering strategies that sought to increase stormwater capacity and velocity. In addition, non-native vegetation has encroached on native vegetation in many sites. Implementation of the proposed project would restore some of the ecological integrity that has been lost at the creek sites. This would be accomplished through the daylighting of culverted waterways, the removal of concrete channels and banks, the restoration of natural channels, and revegetation with native plant species. These activities would enhance the visual quality of numerous open space sites throughout Oakland by offering increased opportunity to study natural features and understand hydrologic processes. The proposed creek restoration activities could also attract native wildlife, which would in itself improve visual quality. Therefore, this group of project components would have a less-than-significant effect on the existing visual character of the various creek component sites.

(4) Create a New Source of Substantial Light and Glare Which Would Substantially and Adversely Affect Day or Nighttime Views in the Area. None of the Measure DD Implementation Project components would result in substantial light and glare, as discussed below for each of the four project groups, and all groups would incorporate Condition of Approval 28 into the project components if lighting is proposed to be installed.

Lake Merritt and Lake Merritt Channel (Group 1). The Lake Merritt project components could involve the installation of new lighting in certain areas, where needed for public safety. These lights, which are not expected to be widespread around the Lake, would not substantially adversely affect nighttime views. Historic buildings, including the Pergola and Boathouse, would be restored as part of the project. However, anticipated restoration activities would not involve the installation of large quantities of reflective windows. Therefore, the project would not substantially increase glare.

Waterfront Trail (Group 2). New lighting could be installed in select locations along the shoreline, where necessary for public safety. This type of lighting would not substantially reduce nighttime views.

Recreational Facilities (Group 3). The rehabilitation of Studio One is not expected to result in the installation of substantial quantities of new outdoor lighting and it would not include large expanses of highly reflective glass. New windows would be similar to existing ones, and would not create significant glare.

The proposed recreational facilities at Ira Jinkins Park would be built with new outdoor lighting. However, this lighting would be down-shielded, and would be installed only where needed to protect public safety. The plans for the recreational facilities at Ira Jinkins Park include some glass facades, primarily on the east side of the buildings that would face the recreation facility's landscaped parking area and an industrial facility located across the street. The glass is not expected to create glare that would substantially and adversely affect views. However because all glass has some potential to reflect light, the building materials and design would be assessed by the City during Design Review to ensure that light reflected off these glass facades would not create substantial glare.

City-wide Creeks (Group 4). The City-wide Creeks group does not involve the installation of new lighting and would not build structures that would produce glare.

V. ALTERNATIVES

The *CEQA Guidelines* require the analysis of a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the project's basic objectives and avoid or substantially lessen any of the significant effects of the project. The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice.[1] CEQA states that an EIR should not consider alternatives "whose effect cannot be ascertained and whose implementation is remote and speculative."

The primary purpose of this chapter is to ascertain whether there are alternatives of design, scale, land use, or location that would substantially lessen the project's significant project impacts, even if those alternatives "impede to some degree the attainment of project objectives, or would be more costly."[2] The alternatives considered should be capable of avoiding or substantially lessening one or more of these project impacts. The emphasis of the analysis is on comparison of the anticipated impacts of each alternative to the impacts associated with the proposed project; the discussion includes a determination as to whether or not each alternative would reduce, eliminate, or create new significant impacts.

This section reviews the project objectives and impacts, describes limitations of the scope and location of alternatives imposed by the requirements of Measure DD, describes and analyzes the project alternatives, and identifies the environmentally superior alternative.

A. PROJECT OBJECTIVES AND IMPACTS

To determine what range of alternatives should be considered, the impacts identified for the proposed project were considered along with the project objectives. The proposed project and the project objectives are described in detail in Chapter III, Project Description. The potential environmental effects of implementing the proposed project are analyzed in Chapter IV, Settings, Impacts and Mitigation Measures. Both the project objectives and impacts are summarized briefly below.

1. Project Objectives

As stated in Section 3 of the 2002 ballot measure the "object and purpose [of Measure DD] is to acquire and construct water quality improvements for and related to Lake Merritt, Lake Merritt Channel, the Estuary and creeks in Oakland; to improve, renovate and construct youth and public recreational facilities including the East Oakland Sports Center, Studio One and Fairyland; to rehabilitate and acquire parks, open space and other recreational safety and maintenance facilities; and to provide safe public access to Lake Merritt, Lake Merritt Channel, and the Estuary." In addition, the City Council Resolution that placed Measure DD on the ballot indicates that the

[1] *CEQA Guidelines*, Section 15126.6.

[2] CEQA Guidelines, 2005. Section 15126.6(b).

Measure's funding is intended to support a number of the objectives laid out in elements of the City's General Plan, including the Open Space Conservation and Recreation Element (OSCAR) and the Estuary Policy Plan.

2. Project Impacts

Impacts are identified in the following areas as potentially significant for the project, but could be reduced to a less-than-significant level with implementation of recommended mitigation measures:

- Land Use (Group 2);
- Transportation, Circulation and Parking (Group 1);
- Biological Resources (Groups 1, 2 and 4);
- Cultural Resources (Groups 1 and 4);
- Hydrology and Water Quality (Groups 1 – 4); and
- Hazards and Hazardous Materials (Group 1).

Three significant impacts related to traffic (Impacts TRANS-5, TRANS-6, and TRANS-7) in the Lake Merritt and Lake Merritt Channel group (Group 1) are identified as potentially significant and unavoidable as they may not be mitigated to less-than-significant levels. As a result, under the proposed project scenario, these impacts would remain significant and unavoidable. One other impact (NOISE-1) associated with the Group 1 would be reduced to less-than-significant levels by the City's Standard and Uniformly Applied Conditions of Approval but implementation of noise-reducing measures may not be feasible in all cases and, if not, the impact would be significant and unavoidable.

B. LIMITATIONS TO SCOPE AND LOCATION OF ALTERNATIVES

Measure DD, as approved by Oakland voters in November 2002, provides funding for specific projects and actions to improve water quality and provide recreational opportunities within the City of Oakland (Appendix A). Section 3 of the Measure DD states that, "The improvements, acquisition and construction to be funded by the net proceeds of the bonds shall be limited to those listed in Exhibit A attached to this Ordinance." For example, the project list and funding for the *Lake Merritt Restoration and Water Quality Improvements* includes the following:

- Water Quality ($14,000,000)
    - Replace 12th Street culvert with an arched bridge to increase tidal flow and flushing into Lake Merritt
    - Water quality improvements, including storm water filters, trash barriers, wildlife waste clean- up facilities and aeration fountains
- Recreation and Youth Activities ($14,500,000)
    - Children's Fairyland improvements, including historic restoration, drainage, amphitheater and play structure improvements
    - Renovate municipal boathouse and restore public use

  - Restore and renovate Lakeside Park sailboat house, including boat storage and conversion of parking lot to public shoreline area
- Park Restoration and Access ($59,750,000)
  - Create park space and beach area along Lake Merritt south shore and redesign 12th Street to create safe pedestrian and bicycle access from Lake Merritt to Kaiser Convention Center and Channel Park
  - Improve and renovate maintenance facilities, landscaping, docks, restrooms, furnishings and signage
  - Repair Lake Merritt retaining walls
  - Widen and improve pedestrian and bicycle paths and lanes
  - Reconfigure Bellevue Avenue for better access and parking accommodations
  - Expand Snow Park by reconfiguring Lakeside, Harrison and 20th intersection
  - Reconfigure El Embarcadero roadways for safer pedestrian and traffic access

Measure DD thus puts limitations on the potential and feasible alternatives available for consideration in this CEQA analysis. Funded projects can be modified or removed, but actions or improvements not identified in Exhibit A of Measure DD are not eligible for funding, and thus are not feasible Measure DD actions. Alternative locations for projects are likewise not feasible in most cases because the funded actions are tied to specific sites (e.g., "create park space and beach area along Lake Merritt south shore and redesign 12th Street to create safe pedestrian and bicycle access from Lake Merritt to Kaiser Convention Center and Channel Park"). For these reasons the alternatives analysis focuses on reduced or modified projects that meet at least some of the project objectives and conform to the limits placed on projects by Measure DD.

C. PROJECT ALTERNATIVES SUMMARY

Brief summaries of the alternatives considered but not evaluated and alternatives for Groups 1 through 4 are provided below. This section also includes an analysis of the alternatives for Groups 3 and 4, which are addressed at the program level in this EIR. Detailed descriptions of the alternatives for Groups 1 and 2 and an analysis of their potential impacts as compared to the proposed project are presented in Sections V.D through V.F below.

1. Alternatives Considered but not Evaluated

Lake Merritt and Lake Merritt Channel (Group 1). Closure of the El Embarcadero couplet was considered during the project design process, but eliminated from further consideration because of the significant impacts it would have on traffic. This alternative would have completely removed the El Embarcadero couplet between Lake Merritt and the Lakeview Branch Library, which would have created a larger public space and reduced potential noise and air quality impacts to library users. However, this alternative would have created substantially greater traffic circulation impacts at nearby intersections, particularly at the intersections of Lakeshore and Lake Park Avenues and at Lakeshore Avenue and MacArthur Boulevard. In addition, the project as designed was determined to have effects on noise and air quality that are less-than-significant, so the alternative would not have

addressed any significant impacts. The results of the traffic study for this alternative are provided in Appendix E.

a. 12th Street Lid Park Alternative. A "lid park" alternative for the 12th Street roadway reconstruction was studied as part of the Lake Merritt Master Plan process.[3] The lid park alternative envisioned a landscaped deck extending above a covered roadway from the Kaiser Convention Center parking lot to the Lake Merritt shoreline. The lid structure would have been planted as a park with walkways, lawn and trees and would have provided unimpeded pedestrian access to the Lake edge from the Kaiser Convention Center. Stairs would provide access down to the shore. In order for the structure to meet elevations critical to pedestrians, the roadway would have been lowered and shifted away from the water. The alternative was identified as undesirable by community members and the design team due to several factors including: no direct estuary pedestrian connections were possible; tidal flow was not improved from the current conditions; the structure would not enhance shoreline access; and the cost to build the structure was not justified by the benefits.

b. Lake Merritt Channel. Four alternatives were studied in the Feasibility Study and Greenbelt Plan for the Lake Merritt Channel.[4] All of the alternatives in the feasibility study contained at least some elements that have been included in the project. Each, for example, proposed to replace the culverts under 12th Street with a new bridge. On the other hand, several components were considered but not carried forward. Two alternatives in the feasibility study considered leaving the 7th Street flood control structure where it is while making minor improvements to the pedestrian tunnels on either side of the structure, and two considered relocating the flood control structure to the mouth of the Channel at Lake Merritt. The relocation component proposed placing the tide gates under the new pedestrian bridge at the Channel mouth and constructing a pump station on the shore of Lake Merritt. Leaving the structure as is would not provide the desired navigation access in the Channel while relocating the structure would have created more impacts near the Lake's shoreline (e.g., placement of the flood control structure and pump station in a more publicly visible location) than the option ultimately selected for the project.

In addition to the alternatives considered in the *Feasibility Study and Greenbelt Plan for the Lake Merritt Channel* the City also evaluated moving the pump station from its current location at 7th Street downstream to an area south of I-880. Relocation of the pump station was considered with and without the construction of a new bridge at 7th Street. These alternatives were not carried forward because modeling of tidal flows showed that the removal of the pump station at 7th Street would provide only negligible benefits to tidal flow compared with putting in a bypass channel. In addition, relocation and construction of a new pump station (either at 12th Street or near I-880) would have higher costs.

c. Waterfront Trail (Group 2). Various alternatives for crossing beneath the bridges spanning the Oakland Tidal Canal were considered during the design process. Alternatives considered include floating piers, fixed piers, underpasses, bridge staircases, and widened catwalks. All but fixed piers were eliminated due to accessibility, environmental, permitting and/or cost criteria. Alternatives for crossing some industrial properties were also examined (for example, going under versus over the conveyor at the Hanson Aggregates site). Because the eliminated alternatives would not reduce or

[3] City of Oakland, 2002. *Lake Merritt Park Master Plan*. July.

[4] URS, 2002. *Feasibility Study Report, Feasibility Study and Greenbelt Plan for the Lake Merritt Channel*, June 24.

avoid any significant impacts that would be created by the proposed project to a greater degree than the alternatives presented below, these alternatives were not evaluated in the EIR. A summary and evaluation of the Waterfront Trail alternatives are presented in the *Oakland Waterfront Trail Phase I Memorandum*.[5]

d. Recreational Facilities (Group 3). Other potential sites for the new sports complex in East Oakland were considered early in the siting process but rejected. A site on San Leandro Street near the Coliseum BART station was considered but was rejected because it would have required relocating businesses and the soil on the site was found to be contaminated. Another site was considered on the west side of I-880 but was judged to be too far from the residential neighborhood and potential facility users.

e. City-Wide Creeks (Group 4). No specific alternatives were considered for this group.

2. Group 1 Alternatives

Alternatives for Group 1 include the **No Project Alternative** and the **Maintain Roadway Circulation Alternative**.

- The **No Project Alternative** assumes no implementation of Measure DD-funded activities beyond the components that have already been completed.
- The **Maintain Roadway Circulation Alternative** would eliminate or modify some of the proposed changes to the roadways around Lake Merritt in order to reduce impacts to traffic the significant and unavoidable impacts identified in the EIR. This alternative is specific to Group 1. To maintain travel lanes for traffic and transit flows on the streets near Lake Merritt the alternative would not include bike lanes (or as a variant, would include bike lanes but eliminate some curbside parking) along Lakeshore Avenue and Lakeside Drive. This alternative would keep El Embarcadero in its current configuration and maintain current travel patterns along the northeast end of Lake Merritt. The alternative would use the alignment of 12th Street as proposed in the 2002 *Lake Merritt Master Plan* with added travel and turning lanes and fewer at-grade crossings for pedestrians in order to maintain traffic and transit flows along 12th Street.

Additional details for each Group 1 alternative are provided, and the alternative's potential impacts are discussed in Sections V.D and V.E below.

3. Group 2 Alternatives

Alternatives for Group 2 include the **No Project Alternative** and the **Waterfront Trail Surface Street Connection Alternative**.

- The **No Project Alternative** assumes no implementation of Measure DD-funded activities beyond the components that have already been completed.
- The **Waterfront Trail Surface Street Connection Alternative** assumes that the Waterfront Trail would not include boardwalks under the existing bridges, but would connect the Waterfront Trail using surface streets. In addition, other as yet incomplete portions of the trail would be

[5] Moffatt & Nichol Engineers, 2005. *Oakland Waterfront Trail Phase 1 Memorandum*, January. A copy is available at City offices.

routed onto streets rather than constructing new trails along the waterfront. This alternative would reduce impacts associated with hazardous waste, cultural resources and hydrology because fewer intrusive activities would be required to construct the project. It would also avoid a significant land use impact, for which implementation of the recommended mitigation is contingent upon concurrence by the property owner and cannot be guaranteed by the City. This alternative is also proposed, in part, because it is uncertain whether the U.S. Coast Guard or other agencies that may have jurisdiction over the Tidal Canal will issue a permit to construct the boardwalks that would continue the trail beneath bridges and because it is uncertain whether some property owners will allow easements to accommodate the trail. The U.S. Coast Guard may have jurisdiction over the part of the Tidal Canal under bridges, but not the remainder of the canal, which is under the jurisdiction of other agencies, such as the U.S. Army Corps of Engineers.

Additional details for each Group 2 alternative are provided, and the alternative's potential impacts are discussed in Sections V.D and V.F below.

4. Group 3 Alternatives

Alternatives for Group 3 include the **No Project Alternative**, a **Reduced Alternative**, and a **Relocation Alternative**.

- The **No Project Alternative** assumes no implementation of Measure DD-funded activities beyond the components that have already been completed. The renovation of the Studio One Arts Center would be completed but the East Oakland Sports Complex would not be constructed.
- The **Reduced Alternative** assumes that the East Oakland Sports Complex would be built at Ira Jinkins Park/Recreation Center but reduced in scale.
- The **Relocation Alternative** assumes that the East Oakland Sports Complex would be built at another location in East Oakland.

Group 3 contains two components, Construction of the East Oakland Sports Complex and Renovation of the Studio One Arts Center. Because the renovation of the Studio One Arts Center is already underway and nearing completion an alternative to this project component is not feasible. An alternative for the East Oakland Sports Complex could include a change in the scale or design of the project or construction of the project at an alternative site.

The East Oakland Sports Complex has been designed at the conceptual level but funds are inadequate to build the facility as proposed. Thus, the City has recently begun developing a reduced scale alternative for the East Oakland Sports Complex. The reduced scale alternative proposes fewer recreational buildings that would be constructed in phases. The first phase would build 22,000 square feet of facilities including an indoor swimming pool, fitness center, and teen room/lobby. An 80 car parking lot is also proposed for the first phase. Future phases would include the addition of an outdoor 25-meter competition swimming pool, two gymnasiums, which would add 25,500 square feet of indoor recreational space, construction of new playing fields, and demolition of the existing recreation center. Based on the analysis in the EIR, the only impacts identified for this component are general impacts to cultural and biological resources and from hazardous materials/waste. These impacts are also likely to occur as a result of a project of reduced scale, as well. The impacts include, for example, the potential to encounter previously undocumented archaeological resources or human remains or to disturb nesting native bird species. Reducing the project in size, reduces the probability

that these impacts would occur but they would remain potential impacts that would require the same mitigation measures as those recommended for the project. These impacts would be reduced to less-than-significant levels by the mitigation measures recommended in the EIR.

The project could, as an alternative, be constructed at a different site. However, other potential sites for the facility in East Oakland would likely have at least some of the same potential impacts as those identified for the Ira Jinkins Park/Recreation Center site, although the probability of occurrence may differ based on historical site use (cultural impacts) or the amount and quality of vegetation present on site for nesting native birds (biological impacts). Other potential sites in East Oakland were considered early in the siting process, but not evaluated further for the reasons stated in Section V.B.1 above. Moving the project to another site might change the probability of a specific impact, but the impacts would require the same mitigation measures as recommended for the project.

The No Project Alternative would avoid the potential impacts associated with the project or the other alternatives, but would not provide all of the recreational benefits associated with the project. The objectives of Group 3 would be partly met because the North Oakland recreational component of the group would be funded and completed. Because $10,000,000 of Measure DD funding is specific for the East Oakland Sports Complex, if this project component were not built, the funding could not be used for other activities or projects.

5. Group 4 Alternatives

Alternatives for Group 4 include the No Project Alternative and a Reduced Alternative.

- The **No Project Alternative** assumes no implementation of Measure DD-funded activities beyond the components that have already been completed.
- The **Reduced Alternative** assumes that the habitat at some creek sites would not be restored and/or some sites would not be acquired.

Group 4 is an aggregation of small creek restoration, acquisition and preservation projects that would receive Measure DD funds. Measure DD allocates $5,500,000 to restoration projects and $4,500,000 to acquiring restorable habitat, creek segments with rainbow trout or other wildlife populations, and property with aesthetic and water quality protection value. If not for the link to Measure DD funds, many of these projects, which include removing non-native vegetation, stabilizing creek banks and replanting with natives, would meet the requirements for a Categorical Exemption under Section 15333, Small Habitat Restoration Projects (Class 33) of the *CEQA Guidelines*. The purpose of the Measure DD-funded creek projects is consistent with the Class 33 category, which exempts projects "[not exceeding] five acres in size to assure the maintenance, restoration, enhancement, or protection of habitat for fish, plants, or wildlife."

By design and to achieve the desired project benefits, the Group 4 project components must occur near creeks and therefore some restoration and acquisition activities have the potential to disturb special-status plants and animals that may already be present at the sites or to encounter and disturb previously undocumented archaeological resources or human remains. Reducing the number of potential creek restoration or acquisition sites within Group 4 would reduce the potential impacts in proportion to the reduction in the number of sites, but not necessarily eliminate the impacts. A reduction in the number of sites achieved by randomly eliminating projects might reduce the possibility of impacts, but the remaining sites would be subject to the same potential impacts and

require the same mitigation measures as recommended for the project. Alternatively, sites with the highest probability of impact could be eliminated, such as those which are known to support some native vegetation and wildlife habitat or where surveys indicate that special-status species are present. While this focused approach would avoid short-term impacts at the eliminated sites, the long-term beneficial effects of the creek restoration projects would also be lost. In addition, if sites were eliminated from the acquisition list, the long-term benefit derived from the City's protection of these sites would be lost. Because Group 4 funding is specifically earmarked for restoration or acquisition, any funds not spent because the project is reduced in scale could not be used for other activities or projects.

D. NO PROJECT ALTERNATIVE (GROUPS 1 AND 2)

Section 15126(d)(4) of the *CEQA Guidelines* states: "The no project analysis shall discuss existing conditions, as well as what could be reasonably expected to occur in the foreseeable future if the project was not approved…" The following discussion describes and analyzes the No Project Alternative for Groups 1 and 2. The No Project Alternative for Groups 3 and 4 were discussed and analyzed in Section V.B above.

Under the No Project Alternative, the components of Measure DD that are not already complete or under construction would generally not be constructed or implemented. Table V-1 lists the Measure DD components in Groups 1 and 2 that have been completed or are in progress, and those that would not be completed under this alternative.

For Group 1, the No Project alternative would include completion of the Pergola, Children's Fairyland, and Municipal Boathouse renovations. However, paths, landscape improvements and additional patron parking (for the Boathouse) that would provide improved access to the facilities would generally not be constructed. The land around Lake Merritt would continue to be used as park land. Landscape maintenance, including the removal and replacement old or diseased trees, would continue as needed. The tree replacement process would generally maintain the current appearance of the park, but no substantial increase in landscaped area or number of trees is likely to occur because there would be no net increase in parkland as would occur if the project were constructed as proposed. The creation of bike lanes by restriping Lakeside Drive and Lakeshore Avenue might occur as part of other projects, but associated landscaping and pedestrian path improvements would not be constructed.

For Group 2, the No Project alternative would include Union Point Park, for which the remediation and construction is already complete, and some segments of the trail that would be completed when the shoreline property or adjoining property is developed. The existing trail system would be maintained. Bicyclists and pedestrians would continue to use the existing trail and transfer to side streets when there is a trail gap.

1. Project Objectives

Because the project components that have already been implemented or that are under construction would be completed, this alternative would meet some project objectives. However, several objectives would not be met. These include creation of recreational park and open space at Lake Merritt and along the Lake Merritt Channel; connection of the southern shoreline of Lake Merritt with

surrounding cultural, civic, and urban districts; enhancement of the connection between Lake Merritt, the Lake Merritt Channel, and the Oakland Estuary; improvement of bicycle and pedestrian safety and circulation; and support for several of the objectives of OSCAR and the Estuary Policy Plan. The following objectives would be partly realized:

Lake Merritt and Lake Merritt Channel Improvements (Group 1)

- Improve water quality and habitat for fish and wildlife; and
- Renovate historic buildings and other structures at Lake Merritt.

Table V-1: No Project Alternative (Groups 1 and 2): Components Completed or In Progress and Components Unbuilt

Lake Merritt and Lake Merritt Channel (Group 1)
Components Completed or In-Progress
• Pergola Renovation (complete)
• Installation of a Fire Protection Main (complete)
• Water Quality Improvements, including storm drain filters at Bellevue/Staten, 27th/Valdez, and 22nd/Valley; pilot air diffuser project; new aeration fountain; Pergola fountain (complete)
• Children's Fairyland Renovations (in-progress)
• Municipal Boathouse Renovation (in-progress)
Unbuilt Components
• 12th Street Improvements
• Lake Merritt Channel
• Lakeshore Avenue, El Embarcadero, and E. 18th Street Pier Improvements
• Lakeside Drive
• Snow Park and Lakeside-Harrison-20th Street Intersection
• Bellevue Avenue Redesign
• Sailboat House
• All water quality improvements except those noted above
Oakland Waterfront Trail (Group 2)
Components Completed
• Union Point Park
• Park Street Triangle traffic study
Unbuilt Components
• Estuary Park
• 10th Avenue Marina
• Brooklyn Basin
• Brooklyn Basin to Embarcadero Cove
• Livingston Pier
• Cryer Site
• ConAgra to Park Street Bridge
• Bridge boardwalks at Park Street, Fruitvale Avenue and High Street
• Derby Avenue to Lancaster Street (Oakland Museum Women's Board warehouse)
• Alameda Avenue south of Fruitvale Avenue
• US Audio/Capture Technologies and friendly Transportation Trail Connection
• Gallagher & Burk/Hanson Aggregate Trail Connection
• 66th Avenue Gateway

Oakland Waterfront Trail and Access Improvements (Group 2)

- Acquire land and construct pathways to complete the San Francisco Bay Trail along the Oakland Estuary;
- Provide additional open space and recreational opportunities along the Oakland waterfront; and
- Remediate environmental hazards that exist on the Oakland component of the San Francisco Bay Trail.

The Group 1 objectives would be partly fulfilled because, as noted in Table V-1, some water quality improvements have been made (e.g., installation of storm drain filters and placement of new aeration fountains in the Lake) and some historic structures have been renovated. Group 2 objectives would be partly fulfilled because the clean-up and creation of Union Point Park provides additional open space and recreational opportunities and the park contains a segment of the Waterfront Trail. However, these components represent only a small number of the potential components that address the project objectives.

Under the No Project scenario, most of the benefits of the project would not be realized. In addition to the objectives for Group 1 that would not be met at all. Contamination at two sites along the Waterfront Trail (i.e., the Brooklyn Basin and Cryer Site) would not be cleaned up as part of Measure DD and funding would need to be acquired from other sources. Most gaps in the Waterfront Trail would remain, which would necessitate that bicyclists and pedestrians periodically shift their route between the existing Waterfront Trail segments and nearby streets as currently occurs.

2. No Project Alternative Impacts

The No Project Alternative would avoid the impacts associated with the proposed project. For both Groups 1 and 2, because there would be no further construction activities, there would be no impacts from ground-disturbing activities, such as the potential to encounter hazardous waste or groundwater wells, or from disturbance of previously undocumented archaeological resources or human remains. Likewise, short-term construction impacts associated with air quality and biological resources would be avoided. For Group 1, no transportation effects (traffic delays or reductions in LOS) associated with reducing the number of travel lanes, reconfiguring intersections or redesigning 12th Street would occur. For Group 2, if the trail were not completed, the potential land use conflict created by extending the trail across the Hanson Aggregate property would be avoided.

3. Alternative Summary

The No Project Alternative would avoid the construction and operational impacts associated with the proposed project, but would not meet a substantial number of the objectives for the project or would meet some of them only in part (due to the few already-completed components).

E. MAINTAIN ROADWAY CIRCULATION ALTERNATIVE (GROUP 1)

The Maintain Roadway Circulation Alternative assumes that the Measure DD components associated with the Waterfront Trail, the Recreational Facilities, and the City-Wide Creeks Groups would be implemented. In this scenario, the number of travel lanes on Lakeshore Avenue and Lakeside Drive would be maintained by eliminating the proposed Class II bike lanes (or as a variant, adding the bike

lanes but removing some curbside parking). In addition, 12th Street would be constructed to follow the alignment proposed in the Lake Merritt Master Plan but would be modified to include additional lanes and a reduced number of pedestrian at-grade crossings combined with pedestrian bridges or underpasses that would span the new boulevard and provide access between the civic facilities south of the roadway (e.g., Oakland Museum and Kaiser Convention Center) and Lake Merritt.

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree or less effectively than the proposed project. All objectives for the Waterfront Trail, the Recreational Facilities, and the City-Wide Creeks Groups would be met. The alternative would make improvements along the Lake Merritt Channel to enhance the Lake's connection to the Oakland Estuary. At Lake Merritt, the alternative alignment of 12th Street would create some new park land along the south shore of the Lake, but fewer acres of new park land would be created by the alternative than by the proposed project.

The acres of new park land created on the south shore of Lake Merritt would be reduced by half—from approximately 3.3 acres to 1.6 acres. No new parkland would be created in the area south of 12th Street, which would be retained as a parking lot for the Kaiser Convention Center. The 1.6 acres of new park land would be created between 12th Street and the south shoreline of Lake Merritt, rather than distributed as 2.5 acres between the 12th Street and the Lake and 0.8 acres between 12th Street and the Kaiser Convention Center, as proposed by the project.

The project objective to improve bicycle circulation around the Lake would not be met because bike lanes would not be added along Lakeshore Avenue or Lakeside Drive (although in the variant, bike lanes would be added while some curbside parking would be eliminated). The alternative also would not improve the connection between Lake Merritt and the surrounding cultural, civic and urban districts to the degree that the project would. Use of underpasses and a bridge to span 12th Street and connect the Lake with the surrounding area would create an environment that is less pedestrian-friendly and potentially less secure than the at-grade street crossings proposed for the project.

2. Maintain Roadway Circulation Alternative Impacts

The Maintain Roadway Circulation Alternative would have a lesser effect on mass transit and traffic as compared to the proposed project. Traffic and circulation impacts caused by the Group 1 project components were significant and unavoidable impacts identified in the EIR. These impacts would be reduced by eliminating several at-grade pedestrian crossings and by widening 12th Street so that it could include additional travel lanes and turn lanes. To reduce potential transit and traffic delays, some at-grade pedestrian connections between the north and south sides of 12th Street would be replaced by underpasses and a bridge. The existing underpass of 12th Street from the Kaiser Convention Center parking lot to Lake Merritt would be retained and modified to provide one of the links. The at-grade pedestrian crossing at the southeast corner of the Kaiser Convention Center parking lot would be replaced by a path connecting the parking lot to the path running along the north bank of the Lake Merritt Channel. Pedestrians could then use the path along the Channel to reach the park and Lake Merritt by crossing under the new 12th Street bridge. A pedestrian bridge would span 12th Street from the southeast corner of the Oakland Museum to the new park along the south shoreline of Lake Merritt. This design was identified during the Lake Merritt Master Plan planning

process as undesirable by community participants but is analyzed here as an approach to reducing traffic and circulation impacts.

The alignment of 12th Street as proposed in the Lake Merritt Master Plan would create an intersection at 12th Street and 14th Street (where traffic emerges from the 11th Street tunnel) with difficult sight lines and complicated traffic flow. The sight lines and traffic flow would be improved by relocating the roadway northward and redesigning the intersection to be similar to that of the proposed project, which would create a "T" intersection. This variant would slightly reduce the amount of park land created between 12th Street and the Lake and create a small piece of park land between 12th Street and the Oakland Museum.

The alternative would reduce the number of trees that would be removed to allow the reconstruction and realignment of 12th Street. In this scenario, the Kaiser Convention Center parking lot would not be reconfigured and therefore the trees located in this area would be preserved. Approximately 59 trees would be preserved, including 12 protected trees (all flowering cherries), in and around the parking area. Trees along the median of the existing 12th Street alignment would still require removal in order to accommodate the new roadway and modified grade of the park land.

Because 12th Street would be closer to Lake Merritt, this alternative would require the construction of a retaining wall along both the north and south sides of the street to accommodate the needed increase in elevation as the street approaches the Lake Merritt Channel from the west. The wall would create a visual barrier between the park and the area north of the street. The proposed project would require a retaining wall of shorter length and lower height, which would be less imposing visually.

Short-term construction impacts associated with air quality, the potential to encounter hazardous waste or groundwater wells, and from disturbance of previously undocumented archaeological resources or human remains would be similar to those associated with the proposed project and would require the same recommended mitigation measures to reduce the potential impacts to a less-than-significant level.

3. Alternative Summary

The Maintain Roadway Circulation Alternative would meet most of the objectives of the project and would reduce transit delays and traffic impacts. Although not a significant impact, this alternative would remove fewer trees at the south end of Lake Merritt because the 12th Street alignment would not encroach onto the Kaiser Convention Center parking lot. However, fewer acres of new park land would be created along the south shore of Lake Merritt and the connectivity between the south shore of Lake Merritt and the surrounding cultural, civic, and urban districts would not be improved. Pedestrian connections would include underpasses (like those presently in place) and a bridge to connect the south shore of the Lake with the surrounding urban area, which would be less pedestrian-friendly and less secure than at-grade street crossings. Bicycle circulation would not be improved.

F. WATERFRONT TRAIL SURFACE STREET CONNECTION ALTERNATIVE (GROUP 2)

The Waterfront Trail Surface Street Connection Alternative assumes that the Measure DD components associated with the Lake Merritt Channel, the Recreational Facilities, and the City-Wide

Creeks Groups would be implemented. In this scenario, the Waterfront Trail would not include boardwalks under the existing bridges, but would continue the Waterfront Trail at bridge crossings by routing the trail onto surface streets. Other, as yet incomplete portions of the trail (at operating industrial facilities and sites with soil contamination, for example), would also be routed onto streets rather than constructing new trails along the waterfront.

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree than the proposed project. All objectives for the Lake Merritt and Lake Merritt Channel, the Recreational Facilities, and the City-Wide Creeks Groups would be met. The alternative would complete the missing segments of the San Francisco Bay Trail along the Oakland Estuary, albeit with segments that would not be constructed on the waterfront but rather on nearby streets. Because the trail would avoid contaminated properties, hazardous waste impacts associated with these properties would not occur but the properties would also not be remediated, one of the objectives of this project group. The alternative would support some of the objectives of OSCAR and the Estuary Policy Plan by completing a linear trail along the waterfront; however because the segments would be completed away from the shoreline in some cases, the alternative would not create as much physical and visual access to the Oakland shoreline as the proposed project.

2. Waterfront Trail Surface Street Connection Alternative Impacts

The Waterfront Trail Surface Street Connection Alternative would reduce or avoid impacts associated with hazardous waste, cultural resources and hydrology, because fewer intrusive activities would be required to construct the project. It would also avoid the land use significant impact, for which implementation of the recommended mitigation is contingent upon concurrence by the property owner and cannot be guaranteed by the City. However, the alternative would have significant impacts on traffic and would reduce bicycle safety because cyclists would share facilities with automobiles and other vehicles rather than having access to a dedicated trail or path. The following discussion describes the impacts of the alternative that would require the trail extension to cross existing roadways. Table V-2 presents the existing and cumulative traffic volumes and growth percentages at the three bridge crossing locations.

a. Park Street. The Park Street location has the highest daily traffic with over 44,000 vehicles during existing conditions and over 52,000 vehicles during cumulative conditions. Due to the high volume of traffic and the lack of traffic controls and traffic gaps, the existing design (an unsignalized and uncontrolled pedestrian crosswalk) does not foster safe crossing.

No feasible mitigation was identified to provide an at-grade crossing of the approach to the Park Street Bridge. A concept that would provide an at-grade crossing at the foot of the bridge would require a signalized pedestrian crosswalk approximately 100 feet north of the bridge where the bridge approach matches the surrounding topography. A pedestrian crossing at this location would be

Table V-2: Existing & Cumulative Daily Traffic Volumes at Bridge Crossing Locations

Year	Direction	Bridges			
		Park St	Fruitvale Ave		High St
			South Leg[a]	North Leg	
Existing	NB	23,364	14,760	6,913	10,751
	SB	20,855	18,269	8,253	10,658
	Bidirectional	44,219	26,790	15,166	21,409
Year 2025	NB	27,389	17,130	8,413	14,101
	SB	24,835	20,734	9,778	13,883
	Bidirectional	52,224	31,625	18,191	27,984
Growth	NB	17.23%	16.06%	21.70%	31.16%
	SB	19.08%	13.49%	18.48%	30.26%
	Bidirectional	18.10%	18.05%	19.95%	30.71%

Source: Dowling Associates, 2007

[a] Existing counts not available, existing data were derived from Fruitvale Avenue north leg data

approximately 70 feet in length across the Park Street Bridge approach. A variation on this concept would be to provide the street crossing closer to the bridge. A closer crossing would require the trail to be ramped up to the elevation of the bridge.

It is unlikely that there would be enough bicycle and pedestrian traffic to satisfy the pedestrian warrant for a traffic signal for either concept that would provide a pedestrian signal north of the bridge. The *Manual on Uniform Traffic Control Devices*, 3rd ed.[6] (MUTCD) published by the Federal Highway Administration requires an average pedestrian volume of 100 crossings or more per hour during a four-hour period or a volume of 190 or more during the peak hour. If a pedestrian signal were installed, it would have to have preemption that could be activated by the bridge operator to clear motor vehicle traffic when waterborne traffic approaches the bridge. Waterborne traffic has priority of service over bicyclists, pedestrians and autos. This concept is not considered feasible because the pedestrian signal warrant is not likely to be satisfied.

A roadway crossing at Glascock Street was proposed in the *Oakland Waterfront Trail Bay Trail Feasibility & Design Guidelines* (EDAW, October 2003) and was further defined in the *Park Street Triangle Traffic Study* (Dowling, 2006).[7,8] The Glascock Street crossing would provide a signal at a street intersection but would require closure of 23rd Avenue. The trail crossing would need to be at the north side of the Glascock Street/29th Avenue intersection to avoid an angular crossing of the rail spur that crosses 29th Avenue. This crossing would be approximately 320 feet north of the bridge. There is currently no funding source identified to implement this design option.

Ford Street is currently signalized at its intersection with 23rd Avenue, approximately 500 feet north of the bridge. That location is too far from the trail to be used by most users, who would likely take a more direct route and cross at an uncontrolled location.

[6] EDAW, 2003. *Manual on Uniform Traffic Control Devices, 3rd Ed.*October.

[7] Federal Highway Administration. *Oakland Waterfront Trail Bay Trail Feasibility & Design Guidelines.*

[8] Dowling and Associates, 2006. *Park Street Triangle Traffic Study.*

None of the available options to crossing the trail under the bridge appears to be feasible.

b. Fruitvale Avenue. The foot of the Fruitvale Avenue Bridge coincides with a signalized intersection at Alameda Avenue. A significant amount of traffic travels westbound on Alameda Avenue turns left at Fruitvale Avenue onto the bridge or turns right from the bridge onto Alameda Avenue. For this reason, the traffic volumes crossing the north leg and the south leg of the intersection are significantly different as shown in Table V-2. Currently, crosswalks are provided only on the north and east legs of the intersection. This configuration would provide an indirect crossing for trail users, requiring them to walk north and cross two roadways in order to return to the trail.

Trail users would also need to cross the rail bridge, which is at a lower elevation than the automobile bridge. There is currently no pedestrian crossing facility at this bridge. While current use of the railroad tracks is rare, crossings could create potential hazards.

Providing at-grade crossings of both Fruitvale Avenue and the existing rail track at the north side of the north side of the Fruitvale Avenue/Alameda Avenue intersection would provide an alternative to crossing Fruitvale Avenue under the bridges. Flashing light signals, automatic gates, or other appropriate warning devices would be installed to warn trail users of approaching trains and to prevent them from entering the crossing as required by PUC.

c. High Street. A discontinuous portion of the trail has already been built on the west side of High Street indicating where the trail would meet the roadway at the Oakland end of the High Street Bridge. There is no marked crossing or traffic control to facilitate crossing at the location. Although the existing traffic volume is comparatively low, this roadway is expected to see the highest growth over the next two decades. Rather than walking 200 feet north to the uncontrolled marked crosswalk, trail users would most likely take a direct route and cross mid-block at the trail. Such mid-block crossings, without proper warning to motorists, may create a traffic hazard.

It is uncertain if a feasible mitigation measure is available for an at-grade trail crossing of High Street. An at-grade crossing at Tidewater Avenue, approximately 200 feet north of the bridge, may not be used unless the designated trail deviates from the waterfront and passes along Tidewater Avenue. Even if this is the case, a traffic signal is not likely to be warranted at this intersection. A flashing warning device could be provided although it would not provide positive control for a trail crossing.

3. Alternative Summary

The Waterfront Trail Surface Street Connection Alternative would meet most objectives of the project but would create less physical and visual access to the Oakland shoreline than the proposed project. The alternative would reduce or avoid impacts associated with hazardous waste, cultural resources and hydrology. However, it would have significant impacts on traffic and would reduce bicycle safety because cyclists would share facilities with automobiles and other vehicles rather than having access to a dedicated trail or path adjacent to the shoreline.

G. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of the environmentally superior alternative in an EIR. For the Measure DD Implementation Project the environmentally superior alternative is the proposed project.

While the No Project alternative would avoid the significant impacts that would result from the proposed project or the other alternatives, the No Project alternative would provide few of the proposed project's environmental benefits. When considered collectively, the effects of the project provide a net benefit and an environmentally superior alternative as compared to the No Project alternative or the other alternatives considered in this analysis. Under the No Project alternative some of the environmental benefits of the proposed project that would not be realized include increased parkland on the southern shore of Lake Merritt, greater public access to the shore of Lake Merritt and to the Oakland Estuary, improved water flow through the Lake Merritt Channel, additional recreational facilities along the Waterfront and in East Oakland, and improved water quality and wildlife habitat within Oakland's watersheds through the restoration or preservation of creekside habitat.

Implementation of the Measure DD project is consistent with the vision laid out in the City's Lake Merritt Park Master Plan, Bicycle Master Plan, and Pedestrian Master Plan; ABAG's Bay Trail Plan; BCDC's San Francisco Bay Plan; and with the policies and goals of the Estuary Policy Plan and OSCAR Element. Implementing the Measure DD project components would create new recreational opportunities, create and preserve open space, and improve water quality within the City of Oakland. The No Project alternative fails to achieve most of the project's objectives, except for those objectives associated with components already completed or under construction. The other alternatives as compared to the proposed project are discussed by project group in the following paragraphs.

For Group 1, the Maintain Roadway Circulation alternative would reduce traffic impacts, which were the significant and unavoidable impacts identified in the EIR for Group 1. However, as is the case with the No Project alternative, many benefits of the proposed project would be reduced or would not be realized. Fewer acres of new park land (approximately half of the acreage of the proposed project) would be created along the south shore of Lake Merritt and the connectivity between the south shore of Lake Merritt and the surrounding cultural, civic, and urban districts would not be improved. The completed project would be less pedestrian-friendly and less secure. Bicycle circulation would not be improved.

For Group 2, the Waterfront Trail Surface Street Connection alternative would reduce or avoid impacts associated with hazardous waste, cultural resources, hydrology and a potentially incompatible land use on industrial property—all of which can be mitigated to a less-than-significant level (although the last is contingent upon concurrence by the property owner and cannot be guaranteed by the City). However, it would have significant impacts on traffic and would reduce bicycle safety. Thus, implementation of this alternative would lead to a complex mix of impacts that would be slightly greater and/or less than the proposed project, depending on the topic. This alternative would provide less access to the Oakland Estuary and a less desirable recreational opportunity.

For Groups 3 and 4, the Reduced Alternatives would have fewer impacts but reducing the scale of these groups likewise reduces their potential benefits—fewer recreational opportunities in East Oakland in the case of Group 3 and fewer preserved and/or restored creeks in the case of Group 4.

VI. CEQA REQUIRED ASSESSMENT CONCLUSIONS

As required by the California Environmental Quality Act (CEQA), this chapter discusses the following types of impacts that could result from implementation of the project components authorized and funded by Measure DD: growth-inducing impacts; significant irreversible changes; unavoidable significant environmental impacts; cumulative impacts; and effects found not to be significant.

A. GROWTH-INDUCING IMPACTS

A project is considered growth inducing if it would directly or indirectly foster economic or population growth or the construction of additional housing.[1] Examples of projects likely to have significant growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential subdivisions or industrial parks in areas that are currently only sparsely developed or are undeveloped.

The Measure DD Project includes four component groups: (1) improvements to Lake Merritt and Lake Merritt Channel; (2) Waterfront Trail improvements; (3) renovation of Studio One and the construction of the East Oakland Sports Complex; and (4) City-wide creek improvements. With the exception of the East Oakland Sports Complex, none of the components within these groups would construct new major structures. The Lake Merritt and Lake Merritt Channel group and the Waterfront Trail group would result in renovation or creation of new recreational amenities, changes in existing roadways, or measures to improve water quality. The City-wide Creeks group would involve improvements to creek segments within the City of Oakland. Except for the creek components, all improvements associated with Measure DD would occur within urban and developed areas of the city. None of the project components would involve the construction of additional housing, require the expansion of an infrastructure system, or result in growth-inducing impacts.

B. SIGNIFICANT IRREVERSIBLE CHANGES

An EIR must identify any significant irreversible environmental changes that could result from implementation of a proposed project. These may include current or future uses of non-renewable resources, and secondary or growth-inducing impacts that commit future generations to similar uses. CEQA dictates that irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.[2] The *CEQA Guidelines* describe three distinct categories of significant irreversible changes: 1) changes in land use which would commit future generations; 2) irreversible changes from environmental actions; and 3) consumption of non-renewable resources.

1 *CEQA Guidelines*, 2005, Section 15162.2 (d).

2 *CEQA Guidelines*, 2003. § 15126.2(c).

1. Changes in Land Use Which Commit Future Generations

The majority of the Measure DD components would renovate or improve existing structures, recreational facilities, roadways, and creeks within the City of Oakland. New land uses would include roadway and park changes associated with Lake Merritt, the creation of new parks and installation of the trail connections associated with the Waterfront Trail, and the construction of the East Oakland Sports Complex. Measure DD would commit future generations to the development of these new land uses. However, future generations could eventually redevelop these sites to other land uses than those presently proposed should these proposed uses become obsolete.

2. Irreversible Damage from Environmental Accidents

Implementation of Measure DD components would result in the renovation of existing structures, construction of a new sports facilities, recreation improvements, roadway improvements, installation of components of the Waterfront Trail, soil remediation activities, water quality improvements, and creek restoration/acquisition activities. No significant irreversible environmental damage, such as what would occur as a result of an accidental spill or explosion of hazardous materials, is anticipated due to implementation of the proposed project. Compliance with federal, State and local regulations identified in Section IV.4-J, Hazards and Hazardous Materials, would reduce the possibility that hazardous substances within the project site would cause significant environmental damage.

3. Consumption of Nonrenewable Resources

Consumption of nonrenewable resources includes conversion of agricultural lands, loss of access to mining reserves, and use of non-renewable energy sources. Except for some of the creek improvements, the Measure DD components are located within urbanized areas of the City of Oakland. No agricultural lands would be converted to non-agricultural uses. In addition, the component sites do not contain known mineral resources and do not serve as a mining reserve; thus, implementation of Measure DD would not result in the loss of access to mining reserves.

Construction of the Measure DD components would require the use of energy, including energy produced from non-renewable resources. Energy consumption would also occur during the use of structures renovated/constructed under Measure DD. Energy would also be used for lighting of non-structure components of Measure DD. Structures constructed under Measure DD would incorporate energy-conserving features, as required by the Uniform Building Code. The proposed project would not substantially deplete non-renewable fuel supplies.

C. UNAVOIDABLE SIGNIFICANT ENVIRONMENTAL IMPACTS

After mitigation, the proposed project would result in three unavoidable significant impacts associated with the Lake Merritt and Lake Merritt Channel (Group 1) project components, as follows:

- **Impact TRANS-5 (Group 1)**: Under Cumulative Plus Project Conditions, the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS F during the PM peak hour.
- **Impact TRANS-6 (Group 1)**: Under the Cumulative Plus Project Conditions, the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour.
- **Impact TRANS-7 (Group 1)**: Under the Cumulative Plus Project Conditions, the Lake Park Avenue/Lakeshore Avenue intersection would degrade to LOS F during the AM peak hour.

One other impact associated with the Group 1 would be reduced to a less-than-significant level by the City's Standard and Uniformly Applied Conditions of Approval. However, implementation of noise-reducing measures may not be feasible in all cases and, if not, the impact would be significant and unavoidable. The impact is as follows:

- **Impact NOISE-1 (Group 1)**: Pile driving would generate noise levels that exceed the City's long-term construction noise standards.

D. CUMULATIVE IMPACTS

CEQA defines cumulative impacts as "two or more individual effects which, when considered together, are considerable, or which can compound or increase other environmental impacts." Section 15130 of the *CEQA Guidelines* requires that an EIR evaluate potential environmental impacts that are individually limited, but cumulatively significant. These impacts can result from the proposed project alone or together with other projects.

1. Methodology

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present or reasonably anticipated relevant projects (including projects outside the control of the lead agency) or a summary of the projections in an adopted planning document. This cumulative impacts analysis considered development that is likely to occur under the build-out of the City of Oakland General Plan.

2. Cumulative Effects of the Measure DD Project

The following analysis examines the cumulative effects of the proposed project. The potential cumulative effects of the proposed project are summarized below for each of the environmental topics that are analyzed in Chapter IV of the EIR.

a. Land Use. The majority of the Measure DD components would renovate or improve existing structures, recreational facilities, roadways, and creeks within the City of Oakland. New land uses would include roadway and park changes associated with Lake Merritt, the creation of new parks and installation of the new trail connections associated with the Waterfront Trail, and the construction of the East Oakland Sports Complex. The proposed land uses associated with the project would be compatible with surrounding land use. One potential land use conflict was identified for the Waterfront Trail group, which would be reduced to a less-than-significant level with implementation of the identified mitigation measure. This site-specific impact would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts.

b. Transportation, Circulation and Parking. A detailed analysis was conducted for the purposes of assessing cumulative environmental impacts to the transportation system as described in Section IV.C. The cumulative analysis identified five significant cumulative impacts related to transportation (TRAF-5 through TRAF-9), three of which are identified as significant and unavoidable because they may not be reduced to less-than-significant levels. The impacts and mitigation are discussed in detail in Section IV.C. No significant impacts were identified for

alternative modes of transportation. The project would not fundamentally conflict with adopted policies, plans, or programs supporting pedestrian and bicycle transportation or transit use. The project would improve both pedestrian mobility and bicycle transportation. Although travel times would increase as a result of the project and affect some transit routes, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Thus, the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impact.

c. Air Quality. The Measure DD components would not have significant operational air quality impacts, therefore a determination of the cumulative impacts would be based on an evaluation of the consistency of the project with the City of Oakland's General Plan and of the General Plan with the regional air quality plan. The City of Oakland's General Plan is consistent with the 2005 Ozone Attainment Plan and the project is consistent with the General Plan; therefore the project would not have a significant cumulative impact.

d. Noise. The project components are primarily recreational facilities and water quality improvements that would not produce substantial noise during their operation and would not contribute substantially to the cumulative noise environment. Cumulative traffic noise impacts for all project components, as shown in Tables IV.E-12 and IV.E-13 and in the discussion under Section IV.E.2.b, include other planned projects within the City of Oakland. The analysis demonstrates that the cumulative noise impacts from traffic would be less than significant for noise sensitive receptors within the City of Oakland.

There would be temporary construction noise impacts that would be significant if noise-reducing measures specified in the City's Standard and Uniformly Applied Conditions of Approval are not feasible. However, these impacts would be site-specific and limited to the duration of construction period. Thus, cumulative construction noise and operational noise impacts would be less than significant.

e. Biological Resources. Project activities are not anticipated to have a cumulative impact on biological resources. The project would generally be conducted in an urbanized area and would increase open space and improve water quality, which would benefit wildlife. Potential temporary impacts to wildlife, such as nesting raptors and songbirds, during construction of some project components were identified, but these would be mitigated by the mitigation measures recommended in this EIR. It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same protective measures for biological resources and would not result in cumulative adverse impacts to wildlife. With implementation of the mitigation measures the potential impacts to biological resources would be fully mitigated and no cumulative effects to biological resources would result from this project.

f. Cultural Resources. Project activities are not anticipated to have a cumulative impact on historical (archaeological and architectural) resources. Archaeological resources are valued for scientific information. Should such resources be encountered, such information shall be retrieved and preserved. An example of a cumulative impact on a historical resource would be demolition of a building that is a contributor to a National Register historic district or an Area of Primary Importance. The project as currently planned would not result in such impacts. In fact, the project's proposed

historical restorations of the East 18th Street Pier, the Cleveland Cascade, and the Sailboat House in the Lake Merritt and Lake Merritt Channel group will likely have a beneficial impact on the Lake Merritt District by restoring these features' integrity.

If human remains are encountered, they will be treated in accordance with Section 7050.5 of the California Health and Safety Code. Cumulative impacts are not anticipated.

g. Hydrology and Water Quality. The majority of Measure DD components would be constructed in an urbanized area of Oakland and would not significantly increase impervious surface coverage or result in flood hazards within the component sites. In fact, several Measure DD Project components would include measures to improve water quality.

Construction and operational-period impacts to stormwater that would result from implementation of the Measure DD Project would be minimized through compliance with the Water Board's regulations and implementation of the City's Standard Conditions of Approval. It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same water quality maintenance measures and would not result in cumulative adverse impacts to water quality. Therefore, implementation of the proposed project would not result in significant cumulative hydrology and water quality impacts.

h. Geology, Soils and Seismicity. The geologic, seismicity, and soils conditions of this site are specific to the individual component sites. Other sites in the vicinity may have similar issues and concerns regarding geological conditions and hazards. For geologic, seismicity, and soils issues, the proposed development does not influence or degrade conditions in the area, as long as the impacts of the individual components are reduced to a less than significant level. There are no cumulative effects.

i. Hazards and Hazardous Materials. The hazards and hazardous materials issues for the proposed project are specific to the individual component sites and would not lead to any cumulative impacts related to hazards. Most components of Measure DD would not store or use substantial quantities of hazardous materials and would, at some sites, help ensure that potential chemical hazards in soil or groundwater are remediated and the risk from these hazards is reduced. Some hazardous materials would be stored for maintenance and disinfection purposes at the proposed East Oakland Sport Complex. As all such storage and use in the City of Oakland must comply with State and local regulations for hazardous materials, this would not have a significant cumulative impact.

j. Public Services and Recreation. Development of the proposed Measure DD Implementation Project, in conjunction with planned future development as anticipated by the City's General Plan, would incrementally increase demand for public facilities and services. However, none of the public facilities or services analyzed would experience significant impacts or create demand beyond that anticipated in the General Plan. Buildout of the cumulative projects would not result in cumulative impacts related to physical capacities, service levels or funding availability, particularly because the increased demand for services has, in many cases, been anticipated in planning and policy documents and would be shared across service areas within the City. As a result, no significant cumulative impacts would result.

k. Utilities and Infrastructure. The proposed Measure DD Implementation Project is located in areas already served by utilities and the incremental increase in demand for services would not require the expansion or construction of new facilities. The cumulative increase demand on the utility providers and infrastructure in the City resulting from implementation of Measure DD, in combination with other reasonably foreseeable projects in Oakland, is anticipated within the General Plan as well as within plans prepared by each of the utility providers to address projected growth. Therefore, no significant cumulative impacts would result.

l. Aesthetic Resources. Implementation of the proposed project would result in numerous visual changes throughout Oakland, including changes associated with the renovation of open space around Lake Merritt, the restoration of historic landmarks, improvements to water quality, the construction of formal trails along shoreline areas, and the restoration of creeks with native vegetation. All of these changes would result in beneficial impacts to the visual quality of Oakland. The projects that would be developed as part of General Plan build-out would also change the visual landscape of Oakland through the development of infill sites, the introduction of more activity to urban areas, and the creation of new open space. Many of these projects are expected to benefit the visual environment of Oakland. However, some of these projects could have adverse aesthetic effects, including impacts to scenic resources (such as historic buildings and trees) and scenic views. The proposed Measure DD Implementation Project would not contribute to these adverse impacts. Therefore, the proposed project would not make a significant cumulative contribution to aesthetic impacts in Oakland and the region.

E. EFFECTS FOUND NOT TO BE SIGNIFICANT

Meetings were held among representatives of City of Oakland departments involved in the project planning and consultants for the City to preliminarily determine the scope of the EIR. In addition to these meetings, a Notice of Preparation (NOP) was circulated on December 8, 2006 and a public scoping meeting was held on January 3, 2007 to solicit comments from the public about the scope of this EIR. Written comments received on the NOP and public comments received during the scoping meeting were considered in the preparation of the final scope for this document and evaluation of the proposed project. The environmental topics analyzed in Chapter IV, Setting, Impacts, and Mitigation Measures, represent those topics which generated the greatest potential controversy and expectation of adverse impacts.

Based on consultation with City staff, visits to the project site, and preliminary research, the proposed project is not expected to result in significant impacts related to the following topics, which are not further evaluated in the EIR.

1. Agricultural Resources

The majority of the Measure DD components are located within the urban environment of the City of Oakland. Those component sites not located within an urban environment are associated with the creek restoration and acquisition. The sites for these creek projects are within park, residential, or resource conservation areas. No agricultural uses or farmland are present within or adjacent to the Measure DD component sites.

2. Mineral Resources

No known mineral resources are located within or near the Measure DD component sites. Mineral resource extraction activities have not taken place within or around the component sites during recent history.

3. Population and Housing

The proposed project does not involve the construction of demolition of housing units. Implementation of Measure DD would have no impact on population and housing within the City of Oakland.

4. Schools

The proposed project does not involve the construction or demolition of housing units. As such, this project would have no impact on the school system.

VII. REPORT PREPARATION

A. REPORT PREPARERS

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APPENDIX A

MEASURE DD TEXT

WHEREAS, the City of Oakland has, through years of extensive public outreach and receiving volumes of public input from the residents of Oakland, adopted the *Estuary Policy Plan* and developed the *Lake Merritt Park Master Plan* for the purpose of preserving and enhancing open space, recreation and economic development activities along Oakland's lake and water front and protecting the environment and water quality;

WHEREAS, the *Lake Merritt Park Master Plan* states:

"Lake Merritt is a park for all of Oakland. The Master Plan promotes a park concept that strengthens the natural resource value for wildlife while providing a unique outdoor experience to people who use the park. As a part of the downtown urban fabric, the park becomes a central green - a place of respite for residents and visitors alike. Recommendations carefully balance the needs of human users with provisions that improve habitat value. ";

WHEREAS, the *Estuary Policy Plan* has been incorporated as part of Oakland's General Plan so that:

"The Estuary Policy Plan calls for a system of open spaces and shoreline access that provides recreational use opportunities, environmental enhancement, interpretive experiences, visual amenities, and significant gathering places . . .
Further, the Estuary Plan proposes a variety of uses that strengthen Oakland's position as an urban center, accommodate economic growth, and encourage development that complements the downtown and adjacent neighborhoods.";

WHEREAS, residents of the City of Oakland, through opinion surveys and City Council public hearings, have strongly expressed support for youth recreational facilities and programs in order to provide youths with positive recreational activities, and the City Council has conducted numerous public hearings to plan and develop the East Oakland Aquatic Center and the Studio One seismic improvements and renovations.

WHEREAS, creek protection and restoration projects reflect the priorities of the City's watershed improvement program, which include water quality improvement, hydrology, flood prevention, and wildlife habitat preservation and which program has the support of community organizations and a variety of county, state and federal agencies;

WHEREAS, it is desirable to implement public priorities pursuant to the *Estuary Policy Plan*, the *Lake Merritt Master Plan*, and develop public recreation facilities, and to ask voters to approve public investments for the implementation;

WHEREAS, the City of Oakland has certified three previous programmatic environmental impact reports that broadly cover the potential, adverse, significant environmental impacts associated with the proposed improvements described herein. These EIRs are as follows: The

Estuary Plan EIR (6/ 99) , the Land Use and Transportation Element (LUTE) EIR (6/ 98) and the Coliseum Area Redevelopment Plan EIR (6/ 95);

WHEREAS, in compliance with the California Environmental Quality Act (CEQA), Section 15162, the City has completed a review of the proposed projects using the three previously certified EIRs as a basis to prepare an addendum to each certified EIR which demonstrates that there will be no new significant environmental effects or a substantial increase in the severity of previously identified significant effects as the result of implementation of the proposed projects;

WHEREAS, the Oakland City Council has reviewed the following environmental documentation for the proposed project:

•The Estuary Plan FEIR (6/ 99)
•The Land Use and Transportation Element EIR (6/ 98)
•The Coliseum Area Redevelopment Plan EIR (6/ 95)
•The Addendum to the Estuary Plan EIR, the LUTE EIR and the Coliseum Area Redevelopment Plan EIR Prepared for the Clean Water, Safe Waterfront Parks and Recreation Trust Fund bond measure (6/ 02);

WHEREAS, the City Council on July 9, 2002, unanimously adopted Resolution No. 77253, entitled a "resolution of the City Council of the City of Oakland determining and declaring that the public interest and necessity demand water quality improvements, recreational facilities, Lake Merritt, Estuary and creek rehabilitation and restoration and open space acquisition and improvements to be financed through the issuance of general obligation bonds (the "Resolution");

WHEREAS, pursuant to said Resolution the City Council found and determined that the cost of these improvements would require City expenditures greater than the amount allowed for by the annual tax levy of the City and that public interest and necessity demand the rehabilitation, restoration, acquisition and completion of these improvements;

WHEREAS, in order to provide for the issuance by the City of Oakland of general obligation bonds to finance the improvements and acquisitions described in said Resolution, it is now necessary for the City Council to pass an ordinance ordering the submission of the proposition of incurring bonded indebtedness for such purposes to the qualified voters of the City of Oakland at an election held for that purpose; and

WHEREAS, the City Council therefore desires to submit said ballot measure to the qualified voters of the City at a general municipal election to be held on November 5, 2002.

NOW, THEREFORE, the Council of the City of Oakland does ordain as follows:

Section 1. A municipal election is hereby called and ordered to be held in the City of Oakland on November 5, 2002, at which election there shall be submitted to the qualified voters the ballot measure set forth below in Section 2.

Section 2. The following measure shall appear on the ballot for said Municipal election in the following form:

MEASURE DD: To improve water quality; provide educational and recreational facilities for children; clean up Lake Merritt; restore Oakland's creeks, waterfront and Estuary; preserve and acquire open space; renovate parks; provide safe public spaces; and provide matching funds to qualify for state and federal funding for these projects, shall the City of Oakland issue $198,250,000 in bonds creating an Oakland Trust for Clean Water, Safe Parks to ensure money will be spent only on approved projects?

The City Council does hereby submit to the qualified voters of the City of Oakland, at the said municipal election, this Ordinance and the measure set forth above.

Section 3. The object and purpose of incurring the indebtedness is to acquire and construct water quality improvements for and related to Lake Merritt, Lake Merritt Channel, the Estuary and creeks in Oakland, to improve, renovate and construct youth and public recreational facilities including the East Oakland Sports Center, Studio One and Fairyland, to rehabilitate and acquire parks, open space and other recreational, safety and maintenance facilities, and to provide safe public access to Lake Merritt, Lake Merritt Channel, and the Estuary. The estimated cost of the improvements and acquisitions is One Hundred and Ninety Eight Million and Two Hundred and Fifty Thousand Dollars ($198,250,000). This estimated cost includes legal and other fees, the cost of printing the bonds and other costs and expenses incidental to or connected with the issuance and sale of the bonds. The improvements, acquisition and construction to be funded by the net proceeds of the bonds shall be limited to those listed in Exhibit A attached to this Ordinance.

Section 4. Based on its review and consideration of the foregoing environmental documentation, the Oakland City Council finds that it has received, reviewed and considered the CEQA documentation and other substantive and procedural components of CEQA compliance for the Clean Water, Safe Waterfront Parks and Recreation Trust Fund bond measure. The CEQA documentation prepared for the bond measure has been completed, and review procedures required by CEQA have been completed in conformance with CEQA as set forth in the recitals to this resolution. The City Council further determines that there are no new significant environmental impacts associated with the proposed projects that have not been previously identified in the CEQA documentation, and that there is no substantial increase in the severity of an impact that has been previously identified.

Section 5. The amount of the principal of the indebtedness to be incurred is not to exceed One Hundred and Ninety Eight Million and Two Hundred and Fifty Thousand Dollars ($198,250,000) . The cost of repayment of the bonds is projected to average no more than $20.00 per year per $100,000 of assessed property valuation, provided however that such projection shall not be construed to limit the power and duty of the City Council to cause to be levied and collected a tax sufficient to pay debt service on the bonds in any fiscal year.

Section 6. The maximum rate of interest to be paid on the indebtedness shall not exceed twelve percent (12%) per annum, or such higher rate as may be established for general obligation bonds of the City by the legislature of the State of California.
Section 7. The net proceeds of the bonds shall be deposited into a special trust account with the treasury of the City of Oakland and shall be allocated and expended at the direction of the City Council of the City of Oakland for purposes set forth in this Ordinance. The City Council shall order an independent audit of the expenditure of bond proceeds no later than three years from the date of the issuance of the bonds for such proceeds to ensure proceeds are being expended for purposes set forth in this Ordinance.
Section 8. The City Council does hereby submit to the qualified voters of the City, at said municipal election, the ordinance and ballot measure set forth in Section 2. The City proposes to rehabilitate, renovate, acquire or construct the improvements referenced herein and to issue and sell general obligation bonds of the City of Oakland pursuant to Article 1, commencing with Section 43600, of Chapter 4 of Division 4 of Title IV of the Government Code of the State of California, in one or more series, in the maximum amount and for the objects and purposes set forth above if two-thirds of all qualified voters voting on the ballot measure vote in favor thereof. The bonds are to be general obligations of the City of Oakland payable from and secured by taxes levied and collected in the manner prescribed by laws of the State of California. All of said bonds are to be equally and ratably secured, without priority, by the taxing power of the City.

EXHIBIT A

OAKLAND TRUST FOR CLEAN WATER, SAFE PARKS PROJECT LIST
I. LAKE MERRITT RESTORATION AND WATER QUALITY IMPROVEMENTS

A. Water Quality $14,000,000

•Replace 12th Street culvert with arched bridge to increase tidal flow and flushing into Lake Merritt
•Water quality improvements, including storm water filters, trash barriers, wildlife waste clean- up facilities and aeration fountains

B. Recreation and Youth Activities $14,500,000

•Children's Fairyland improvements, including historic restoration, drainage, amphitheater and play structure improvements
•Renovate municipal boathouse and restore public use
•Restore and renovate Lakeside Park sailboat house, including boat storage and conversion of parking lot to public shoreline area

C. Park Restoration and Access $59,750,000

•Create park space and beach area along Lake Merritt south shore and redesign 12th Street to create safe pedestrian and bicycle access from Lake Merritt to Kaiser Convention Center and Channel Park

•Improve and renovate maintenance facilities, landscaping, docks, restrooms, furnishings and signage
•Repair Lake Merritt retaining walls
•Widen and improve pedestrian and bicycle paths and lanes
•Reconfigure Bellevue Avenue for better access and parking accommodations
•Expand Snow Park by reconfiguring Lakeside, Harrison and 20th intersection
•Reconfigure El Embarcadero roadways for safer pedestrian and traffic access

II. ESTUARY WATERFRONT ACCESS, PARKS AND CLEAN UP

A. Water Quality Improvements and Hazardous Materials Remediation $9,500,000

•Land acquisition for environmental clean up and conservation
•Hazardous materials clean up

B. Waterfront Trail and Parks Acquisition and Construction $43,500,000

•Pedestrian and bicycle trail acquisition and construction along Estuary waterfront to provide continuous public access from Jack London Square to Martin Luther King, Jr. Regional Shoreline ($19.5 million)
•Public access area for shoreline parks, Martin Luther King wetlands and trails and City sportsfields ($2 million)
•Acquisition and development of following parks along Estuary waterfront ($22 million) :
* Estuary Park at mouth of Lake Merritt Channel into the Estuary
* Meadows Park at 5th Avenue

* New park in area of 9th Avenue Terminal

* Union Point Park at 23rd Avenue

III. LAKE MERRITT TO ESTUARY CONNECTION (LAKE MERRITT CHANNEL)

A. Water Quality Improvements $25,000,000

•Removal of 10th Street culvert to improve waterflow from Estuary to Lake and provide boat and pedestrian access
•Relocation of flood control barrier at 7th Street to improve water flow and provide boat and pedestrian access

B. Pedestrian and Bicycle Access, Wetlands Restoration and Other Channel and Shoreline Improvements

$2,000,000

IV. YOUTH AND PUBLIC RECREATION FACILITIES

A. East Oakland Aquatic, Sports and Recreation Facilities $10,000,000

B. Studio One Seismic Renovations and Recreation Facilities

$10,000,000

V. CREEKS AND WATERWAYS RESTORATION

A.Creek Restoration Projects, including restoration of creek segments to improve water quality, hydrology, and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship. Creeks may include: **$5,500,000**

- Sausal Creek
- Lion Creek
- Palo Seco Creek
- Cinderella Creek
- Arroyo Viejo Creek
- Shepard Creek
- Glen Echo Creek
- Temescal Creek
- Coliseum Slough
- Horse Shoe Creek
- San Leandro Creek
- Peralta Creek
- Courtland Creek

B. **Acquisition of Watershed Protection Easements,** including acquisition of high-value, restorable habitat, watersheds of creek segments with presence of rainbow trout and other wildlife populations, and property of high aesthetic and water- quality protection values. **$4,500,000**

TOTAL **$198,250,000**

APPENDIX B

LIST OF ACRONYMS

LIST OF ACRONYMS

ABAG	Association of Bay Area Governments
ACCWP	Alameda Countywide Clean Water Program
ACDEH	Alameda County Department of Environmental Health
ACM	Asbestos-Containing Materials
AOU	American Ornithologists' Union
APCO	Air Pollution Control Officer
A-PEFZA	Alquist-Priolo Earthquake Fault Zone Act
API	Area of Primary Importance
BAAQMD	Bay Area Air Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
bgs	below the ground surface
BMPs	Best Management Practices
CAA	Clean Air Act
Cal EPA	California Environmental Protection Agency
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CESA	California Endangered Species Act
CMA	Alameda County Congestion Management Agency
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CORE	Citizens of Oakland Respond to Emergencies
Corps	U.S. Army Corps of Engineers
CRMP	Creek Restoration and Mitigation Plan
CUPA	Certified Unified Program Agency

dB	decibel
dBA	A-weighted scale decibel
dbh	diameter-at-breast height
DIR	California Department of Industrial Relations
DOSH	Division of Occupational Safety and Health
DOT	U.S. Department of Transportation
DPR 523	Department of Parks and Recreation Form 523 Records
DTSC	California Department of Toxic Substances Control
EB	Eastbound
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EMS	Emergency Medical Services
EMTs	Emergency Medical Technicians
EPA	United States Environmental Protection Agency
ESLs	Environmental Screening Levels
Estuary Plan	The Estuary Policy Plan
ESU	evolutionarily significant unit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRMs	Flood Insurance Rate Maps
FRWP	Freeport Regional Water Project
FUDS	Formerly Used Defense Sites
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Filters
HMMP	Hydrograph Modification Management Plan
HMP	Hydromodification Plan
HPE	Historic Preservation Element
HSC	California Health and Safety Code
HSP	Health and Safety Plan
HUD	U.S. Department of Housing and Urban Development
I-580	Interstate 580
I-880	Interstate 880
kV	kilovolt
Ldn	Day-Night Average Sound Level
Leq	Equivalent Continuous Sound Level

Lmax	The Maximum Noise Level
LMC	Lake Merritt Channel
LMMP	Lake Merritt Master Plan
LOS	Levels of Service
LTS	Less Than Significant
LUTE	City of Oakland Land Use and Transportation Element
MBTA	Migratory Bird Treaty Act
Measure DD	Oakland Trust for Clean Water, Safe Parks
MEI	Maximally Exposed Individual
mg/m3	Milligrams per Cubic Meter
mgd	Million Gallons per Day
MHHW	Mean Higher High Water
MLD	Most Likely Descendant
MMI	Modified Mercalli Intensity Scale
MMPA	Marine Mammal Protection Act
mph	miles per hour
msl	Mean Sea Level
MTC	Metropolitan Transportation Commission
Mw	Moment Magnitude
MWWTP	Main Wastewater Treatment Plant
NAAQS	National Ambient Air Quality Standards
NAHC	California Native American Heritage Commission
NAHC	Native American Heritage Commission
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHL	National Historic Landmark
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
Nox	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRH	National Register of Historic Places
NWIC	Northwest Information Center
NWP	Nationwide Permit
O_3	Ozone
OCHS	Oakland Cultural Heritage Survey
OES	Office of Emergency Services
OFD	Oakland Fire Department
OFSA	Oakland Fire Services Agency

OHP	State of California Office of Historic Preservation
OHWM	ordinary high water mark
OMC	Oakland Municipal Code
OPD	Oakland Police Department
OPR	City of Oakland Office of Parks and Recreation
OSCAR	Open Space, Conservation, and Recreation Element
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
Pb	lead
PCBs	Polychlorinated Biphenyls
PCN	Pre-Construction Notification
PG&E	Pacific Gas & Electric Company
Planning Code	The City of Oakland Planning Code
PM	Particulate Matter
ppm	Parts Per Million
PRC	Public Resources Code
psi	pounds per square inch
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act of 1976
ROG	Organic Gases
RTIP	Regional Transportation Improvement Program
S	Significant
SAFETEA-LU	Safe, Accountable, Flexible, Efficiency Transportation Equity Act: A Legacy For Users
SAFZ	San Andreas Fault Zone
SARA	Superfund Amendments and Reauthorization Acts of 1986
secs	Seconds
SEMS	Standard Emergency Management System
SMGB	California State Mining and Geology Board
SMHM	Salt Marsh Harvest Mouse
SMP	Site Management Plan
SO_2	Sulfur Dioxide
SU	Significant and Unavoidable
SVOCs	Semi-Volatile Organic Compounds
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminants
TETAP	Traffic Engineering Technical Assistance Program
ULR	Urban Land Redevelopment
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank

V/C	Volume-To-Capacity
Water Board	San Francisco Bay Regional Water Quality Control Board
WB	Westbound
WRRP	Waste Reduction and Recycling Plan
WWF	Wet Weather Wastewater Treatment Facilities

APPENDIX C

NOTICE OF PREPARATION AND SCOPING COMMENT LETTERS

**NOTICE OF PREPARATION (NOP) OF A
DRAFT ENVIRONMENTAL IMPACT REPORT (EIR)
MEASURE DD PROJECT**

The Oakland Community and Economic Development Agency, Planning and Zoning Division, is preparing a Draft Environmental Impact Report (EIR) for the Measure DD Project, and is requesting comments on the scope and content of the EIR. The City of Oakland is the Lead Agency for the project and is the public agency with the greatest responsibility for either approving the project or carrying it out. This notice is being sent to Responsible Agencies and other interested parties. Responsible Agencies are those public agencies, besides the City of Oakland, that have a role in approving or carrying out the project. Responsible Agencies will receive a copy and use the EIR when considering approvals related to the project. When the Draft EIR is published, it will be sent to all Responsible Agencies and to others who respond to this NOP or who otherwise indicate that they would like to receive a copy.

Written comments on the NOP must be received **by 5:00 p.m. January 8, 2007**. Your response and any questions or comments on this NOP should be directed to: Elois Thornton, Planner IV, Community and Economic Development Agency, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612; 510-238-6284 (phone); 510-238-6538 (fax); eathornton@oaklandnet.com. Please reference case number ER060017 in all correspondence. In addition, comments may be provided at the EIR Scoping Meeting to be held before the City Planning Commission.

**EIR SCOPING MEETING – CITY PLANNING COMMISSION
Wednesday, January 3, 2007
6:30 p.m.
City Hall, 1 Frank H. Ogawa Plaza
Hearing Room 1**

PROJECT TITLE: Measure DD Project

PROJECT LOCATION: The Measure DD Project has components located throughout the City of Oakland. Please see Figures 1, 2, and 3 which show the locations of the project components.

PROJECT SPONSOR: City of Oakland

PROJECT DESCRIPTION: Measure DD is a municipal bond measure passed by Oakland voters in 2002. Measure DD authorizes the City to issue bonds that fund two types of activities or actions—those that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. Activities funded by Measure DD are grouped as follows:

- Lake Merritt and Lake Merritt Channel
- Oakland Waterfront Trail and Access
- East and North Oakland Recreational Facilities
- City-wide Creeks

The components of each group are listed in Table 1 and described below. Figures 1, 2, and 3 show the approximate locations of the Measure DD activities.

Lake Merritt and Lake Merritt Channel

The major components in the Lake Merritt and Lake Merritt Channel group are the 12th Street Reconstruction, Lake Merritt Channel, Lakeshore Avenue/El Embarcadero, Lakeside Drive/Municipal Boathouse, Bellevue Avenue Redesign, and Snow Park/Lakeside-Harrison-20th Street Intersection. Additional components include the renovation of Children's Fairyland, renovation of the Pergola, neighborhood connections at Cleveland Cascade and E. 18th Street, water quality improvements for the Lake and others as identified and briefly described in Table 1. The major components are described in additional detail in the following paragraphs.

12th Street Reconstruction

The 12th Street Reconstruction involves reconfiguring the existing 12-lane expressway across the 12th Street dam into a six-lane, tree-lined boulevard. Removal and replacement of the existing roadway would allow the City to create four acres of new parkland along the south shore of Lake Merritt. The new park would contain a landscaped area, an overlook plaza, multi-use paths and a restroom. The project limits extend from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue. Lakeshore Avenue would be made into a cul de sac near 12th Street, and traffic flow diverted onto 1st Avenue. The existing culverts at Lake Merritt Channel would be replaced with a clear-span bridge. A tidal wetland would be created along the Channel at Peralta Park.

Existing plantings and irrigation would be renovated. This includes removing existing trees from the median strip along 12th Street, from the Kaiser Convention Center parking lot and from some areas along the banks of the Lake Merritt Channel and replanting with new trees. The trees are being removed because they are in conflict with the new construction, are diseased, have severe structural defects, or are fast-growing, short-lived trees reaching the end of their life expectancy.

Lake Merritt Channel

The Lake Merritt Channel is a narrow waterway that connects Lake Merritt with the Estuary and San Francisco Bay. Measure DD components along the Channel are intended to improve water flow, provide small boat passage, enhance bicycle and pedestrian access, restore wetlands, and make other Channel and shoreline improvements. Major work includes replacement of the restrictive culvert at 10th Street with a clear-spanning bridge and construction of a gated by-pass channel around the 7th Street Flood Control Station, which is operated by the Alameda County Flood Control District. Some trees along the Channel would be removed in order to create open water and wetlands as part of the Channel improvements.

Lakeshore Avenue / El Embarcadero

Improvements along Lakeshore Avenue would include the addition of bike lanes along the roadway and the renovation of landscaping between the roadway and the lake. Lakeshore Avenue would be narrowed from four lanes to two lanes for vehicle traffic and would include Class 2 bike lanes. The number of on-street parking spaces would remain approximately the same as existing.

Table 1: Measure DD Components

LAKE MERRITT AND LAKE MERRITT CHANNEL
Water Quality
Replace the 12th Street culvert at Lake Merritt Channel with a bridge to increase tidal flow into, and flushing of, Lake Merritt
Install stormwater filters, floating trash barriers, and aerating fountains, and implement other water quality improvements, including goose management elements
Construct a bridge to replace the existing culvert at 10th Street
Redesign the Lake Merritt flood control station under 7th and 8th Streets
Recreation and Youth Activities
Renovate Children's Fairyland
Renovate the Municipal Boathouse at 1520 Lakeside Drive and return it to public use
Renovate the Sailboat House and convert some of the adjacent parking lot to parkland
Park Restoration and Access
Reconfigure 12th Street, create a new 4-acre park, and connect these features to the Lake Merritt Channel
Implement system-wide improvements including paths, irrigation, landscaping, furnishing, restrooms and signs
Repair or replace Lake Merritt retaining walls
Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)
Redesign Bellevue Avenue to improve circulation and to accommodate parking moved from the Sailboat House
Expand Snow Park and redesign the Lakeside/Harrison/20th Street intersection
Consolidate the El Embarcadero roadway to form a "Grand Lake green link"
Provide waterfront public access, shoreline, and landscaping improvements
OAKLAND WATERFRONT TRAIL AND ACCESS
Water Quality Improvements and Hazardous Materials Remediation
Acquire land for conservation and remediation purposes
Remediate hazardous materials from contaminated soils
Waterfront Trail and Parks Acquisition and Construction
Provide continuous public access from Jack London Square to Martin Luther King Jr. Regional Shoreline
Construct an access/overlook area at 66th Avenue
Acquire and develop Estuary Park, Meadow Park and a new park in the area of the 9th Avenue Terminal
Complete Union Point Park
EAST AND NORTH OAKLAND RECREATIONAL FACILITIES
Construct the East Oakland Sports Complex
Renovate and restore Studio One
CITY-WIDE CREEKS
Restore and rehabilitate creeks by creating natural meanders, regrading and stabilizing banks, removing failing structures, and landscaping with native plants
Acquire creekside properties to facilitate restoration and habitat preservation

The southern-most traffic couplet on El Embarcadero would be closed to vehicle traffic and would be reconstructed to accommodate the multi-use trail and a new formal plaza area just north of the Pergola. The northerly traffic couplet of El Embarcadero would be widened by approximately two feet toward the Library to safely accommodate two-way traffic. The northerly traffic couplet would be configured with two lanes going eastbound and one lane going westbound.

Approximately 9 acres of existing planting and irrigation would be renovated along Lakeshore Avenue. This includes removing existing trees and replanting with new trees. The trees are being removed because they are diseased, have severe structural defects, are crowding buildings, are in conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy.

Lakeside Drive/Municipal Boathouse

Lakeside Drive, located on the west side of Lake Merritt, would be restriped from four lanes to two lanes for vehicle traffic and would include a Class 2 bike lane. The number of on-street parking spaces would be increased by constructing a median and moving the curb. A multi-use path would be created near the shoreline.

The Municipal Boathouse would be converted from an office facility and would undergo major tenant improvements and structural work. On the upper levels of the renovated Boathouse, space would be provided for a restaurant, a café and a meeting room. On the lower levels, boating facilities would be upgraded to meet current use requirements. Existing parking facilities at the Boathouse would be relocated and consolidated into a single, 28-space lot to be constructed in the existing lawn area north of the Boathouse.

Approximately 4 acres of existing planting and irrigation would be renovated, which includes removing existing trees and planting new trees. The trees are being removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy.

Bellevue Avenue Redesign

Bellevue Avenue, located at the north end of Lake Merritt, would be widened by approximately 11 feet to accommodate diagonal parking (being relocated from the Sailboat House parking lot). Lighting and landscaping would be improved and sidewalk bulb-outs at intersections would be incorporated to improve pedestrian crossings. A parallel pedestrian path would be provided and the Grand Avenue intersection with Bellevue would be narrowed to one lane to improve pedestrian conditions.

Snow Park/Lakeside-Harrison-20th Street Intersection

This project component would reconfigure the street system in the vicinity of Snow Park, which would including the narrowing of Lakeside Drive from four travel lanes to two between 14th and 17th Streets and from four lanes to two between 19th and 20th Streets. Improvements would also include the addition of a northbound bicycle lane in the segment from 15th to 17th Streets and bicycle lanes in each direction within the segment from 19th Street to 20th Street, and the removal of 20th Street between Lakeside Drive and Harrison Street, which would be converted to parkland for both Snow Park and Lake Merritt Park.

Oakland Waterfront Trail and Access

The Oakland Waterfront Trail is a part of the San Francisco Bay Trail, a planned 400-mile network of bicycle and hiking trails that will form a continuous ring around the Bay. Measure DD is intended to help close the gaps in a 6.6 mile portion of the trail between Jack London Square and 66th Avenue. Properties along the waterfront designated for parkland development by Measure DD would be acquired and remediated, as needed. A cleanup plan would be developed for each site where soil or groundwater is contaminated above risk-based clean-up standards. Such plans would specify measures to be taken to protect workers, the public and the environment during remediation. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency.

East and North Oakland Recreational Facilities

The two components within this group are the renovation of the historic Studio One Art Center, located in North Oakland and the construction of an East Oakland Aquatic, Sports and Recreation Complex (Figure 2). Studio One requires extensive seismic reinforcement, new heating, ventilating, lighting, and plumbing systems, plus interior and exterior finish work. Renovation is intended to improve accessibility and functionality and provide maximum flexibility and public safety, while preserving the Studio One's non-institutional atmosphere and historic façade. The East Oakland Aquatic, Sports and Recreation Complex is a proposed 150,000 square foot addition to and expansion of the existing Ira Jenkins Park/Recreation Center at Edes and Jones Avenues in East Oakland. The facility would likely include a 50-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley. Measure DD money has been allocated toward this project, but additional funding must be secured before the project can move forward.

City-Wide Creeks

Oakland's watershed has fifteen main creeks with over thirty tributaries that comprise over 40 miles of open creeks. As part of Measure DD funded activities, the City would restore various targeted creek sites (Figure 3). The intent of the restoration is to improve water quality, hydrology and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship. Specific activities may include creek bank stabilization, riparian habitat restoration, hydrology restoration, public education displays, erosion control, and introduction of native wildlife. Creeks specifically called out in Measure DD were Sausal Creek, Lion Creek, Palo Seco Creek, Cinderella Creek, Arroyo Viejo Creek, Shepard Creek, Glen Echo Creek, Coliseum Slough, Horse Shoe Creek, San Leandro Creek, Peralta Creek, and Courtland Creek. All work would be accomplished in accordance with the City's "Creek Protection, Stormwater Management and Discharge Control Ordinance."

Measure DD also provides funding to acquire high-value, restorable habitat, watersheds of creek segments with presence of rainbow trout and other wildlife populations, and property of high aesthetic and water quality protection values. Restoration activities as described in the preceding paragraph would be performed, as required.

PROBABLE ENVIRONMENTAL EFFECTS: An Initial Study has not been completed for the project and thus the EIR will include a discussion of potential environmental effects for each of the environmental topics included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which include:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Utilities and Service Systems

One or more parcels in the project area may be listed on the "Cortese List" of hazardous waste sites (Government Code Section 65962.5).

Actions/approvals by the City that may be necessary for these projects include without limitation: design review; conditional use permit; tree removal; and grading.

December 8, 2006
File Number ER060017

For Claudia Cappio
Director of Development and Environmental Review Officer

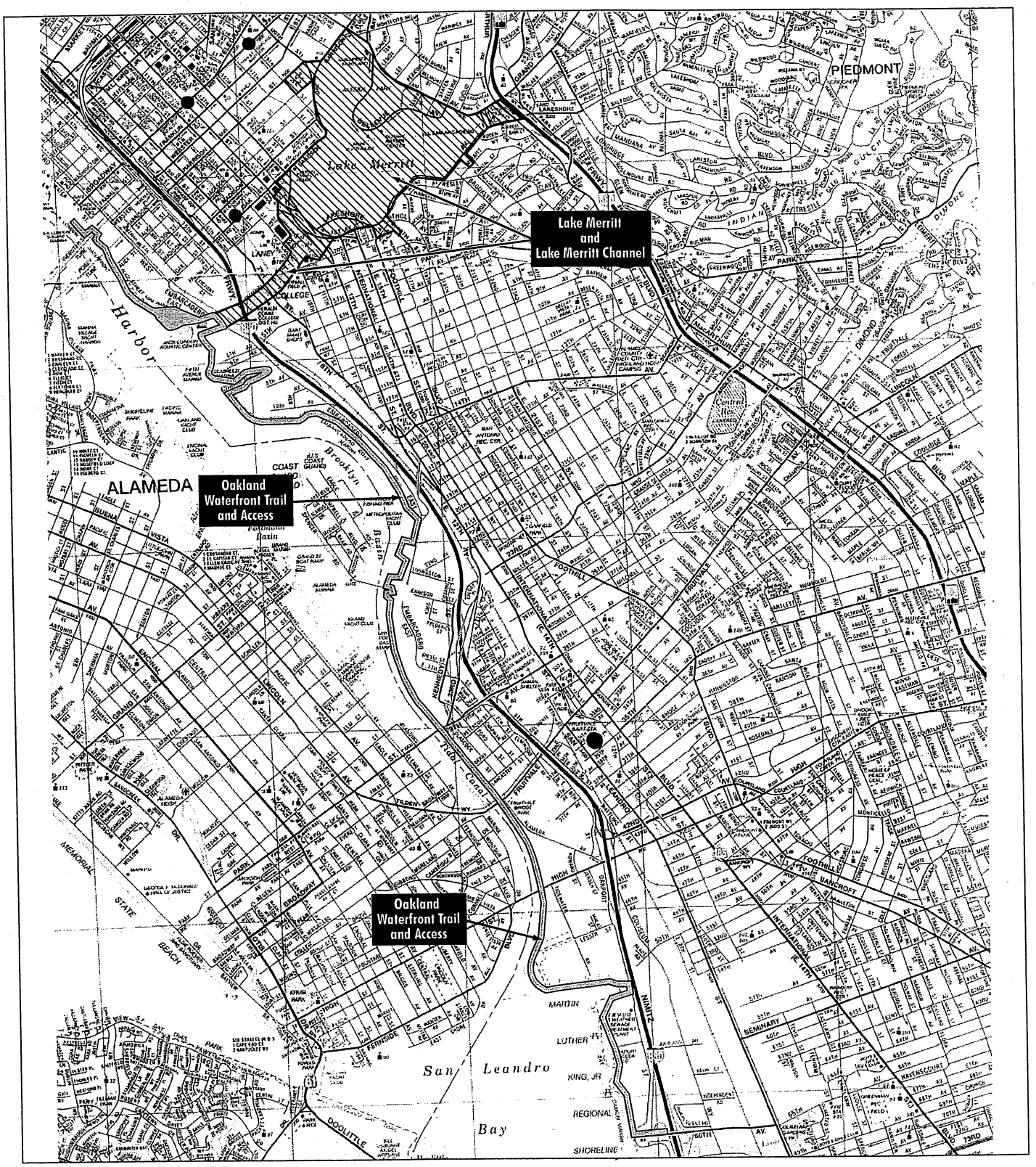

FIGURE 1

LSA

LEGEND

LAKE MERRITT AND LAKE MERRITT CHANNEL

OAKLAND WATERFRONT TRAIL AND ACCESS

0 1600 3200
FEET

Oakland Measure DD
Project Vicinity Map 1

SOURCE: CSAA; LSA ASSOCIATES, INC., 2006.

I:\RAJ0606 measure dd\figures\Fig_1.ai (12/6/06)

LSA

FIGURE 2

LEGEND

PROJECT SITES

0 1500 3000
FEET

Oakland Measure DD
Project Vicinity Map 2

SOURCE: CSAA; LSA ASSOCIATES, INC., 2006.

I:\RAJ0606 measure dd\figures\Fig_2.ai (12/4/06)

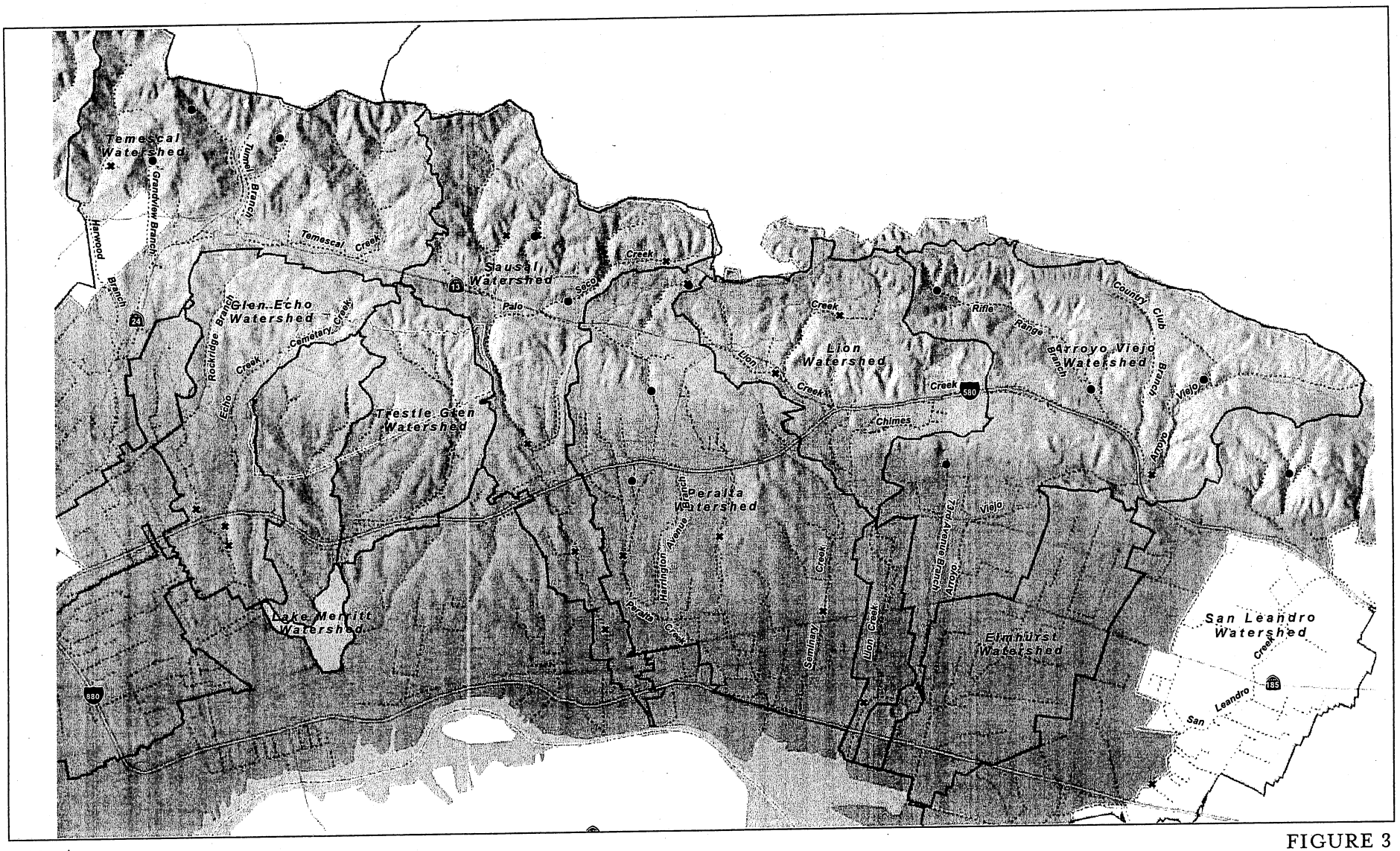

FIGURE 3

LSA

- Restoration Sites
- Preservation/Acquisition Sites
- City Streets
- Streams
- Drainage Areas
- Interstate
- US Highway
- State Highway
- City Limits

N

0 4400 8800
FEET

Oakland Measure DD
Oakland Creek Acquisition and Restoration Sites

SOURCE: JONES & STOKES
I:\RAJ0601 measure dd\figures\Fig_3.ai (12/8/06)

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Community and Economic Development Agency
Planning & Zoning Division

(510) 238-3941
FAX 510) 238-6538
TDD (510) 839-6451

MEASURE DD ENVIRONMENTAL IMPACT REPORT (EIR) PROJECT

NOTICE OF EXTENDED SCOPING PERIOD

TO: All Interested Parties

At the Oakland City Planning Commission's January 3, 2007 Public Scoping Session for this project, the Commission elected to extend the period for receipt of comments on the scope and contents of the forthcoming Measure DD Draft EIR. The previously-noted public comment period (December 8, 2006 – January 8, 2007) has been extended for an additional two weeks. **The deadline for receipt of comments on the content and scope of the Draft EIR is now January 22, 2007 (5:00 p.m.).**

Comments must be in writing and may be sent to:

City of Oakland Community and Economic Development Agency
Attn: Elois A. Thornton, Planner IV
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Or may be e-mailed to: eathornton@oaklandnet.com

If you have questions and/or need further information, please contact me at (510) 238-6284.

LSA
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Elois A. Thornton
Planner IV

Date of Notice: January 4, 2007
File No. ER06-0017

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

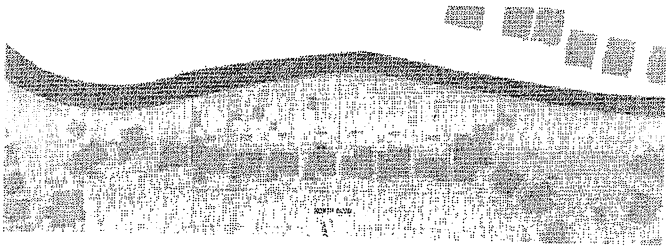
Ms. Thornton – The City of San Leandro is in receipt of the NOP for the above-referenced project (and the Notice to Extend the Scoping Period). In reviewing Figure 3 attached to the NOP, there is one 'Restoration Site' noted at a location that appears to be on the Oakland/San Leandro border (along San Leandro Creek, in the vicinity of North Boulevard – see map included at the bottom of email). According to Table 1 of the NOP, Restoration Sites in general include restoration and rehabilitation of creeks by creating natural meanders, regrading and stabilization of banks, removing failing structures and landscaping with native plants. In the vicinity of this proposed restoration site, properties within the City of San Leandro that 'back up' to San Leandro Creek actually have the property lines extending towards the creek's center line. Because more detailed information on the Restoration Site is not provided in the NOP, for the purpose of the DEIR analysis, we would like to make sure that any potential impacts to residents/resources under the jurisdiction of the City of San Leandro are analyzed and as appropriate, mitigation provided.

If the DEIR will be available on-line, I'm happy to review the document in that format. If the DEIR will only be available in a hard copy format, please mail it directly to me at the city address indicated below. Thank you for the opportunity to comment on the Measure DD DEIR NOP.

Sincerely,

Debbie Pollart, Planning Manager
Community Development Department
835 E. 14th Street
San Leandro, CA 94577
510/577-3327
510/577-6007 (fax)
dpollart@ci.san-leandro.ca.us
www.ci.san-leandro.ca.us

Enlarged map of San Leandro area in proximity to Restoration Site indicated in Measure DD NOP -



From: Kathleen Eichmeier [KEichmeier@actransit.org]
Sent: Monday, January 22, 2007 10:07 AM
To: cathornton@oaklandnet.com
Cc: Nathan Landau; Nancy Skowbo
Subject: Comments on Measure DD NOP
Attached please find AC Transit's comments on the NOP for the Measure DD Projects EIR. Original follows via US Mail.

Kathleen Eichmeier
Executive Administrative Assistant
Service Development Department
AC Transit
1600 Franklin Street
Oakland, CA 94612
Ph: 510.891.4837
Fx: 510.891.4837
Em: keichmei@actransit.org

1600 Franklin Street, Oakland, CA 94612 - Ph. 510/891-4716 - Fax. 510/891-7157
Nancy Skowbo
Deputy General Manager - Service Development

January 22, 2007

Elois Thornton
Planner IV
Community and Economic Development Agency
City of Oakland
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: Notice of Preparation of Draft Environmental Impact Report for Measure DD Project

Dear Ms. Thornton:

Introduction
Thank you for the opportunity to comment on the Notice of Preparation (NOP) for a Draft Environmental Impact Report (EIR) for projects being implemented pursuant to Measure DD.

Measure DD is a $198 million bond passed by the voters of Oakland in 2002. Measure DD provides funds for park, recreation and open space projects throughout Oakland, with an emphasis on the Lake Merritt and Oakland waterfront areas. It also provides funds to develop a park in the former 9th Avenue Terminal area, the area where the Oak to 9th Project has been approved (pending legal actions).

AC Transit has been working closely with the City of Oakland to assure that Measure DD projects—particularly the reconfiguration of the 12th Street Dam roadway—do not degrade the quality of transit service. We appreciate the efforts of the Public Works Department in this regard.

AC Transit is pleased that a comprehensive and well organized analysis of the impacts of the many Measure DD projects will now be made. While AC Transit supports the intent of Measure DD in providing recreational amenities for Oakland residents, we continue to be concerned about the potential for impact on transit operations. The EIR provides an opportunity to systematically identify, analyze, and mitigate those impacts, and should be used for that purpose.

The Crucial Role of 12th Street Dam for East Oakland Transit Service
The project that is most significant to AC Transit involves the substantial narrowing of the roadway across Lake Merritt on the 12th Street Dam. A roadway that now provides six lanes in each direction would be reduced to three lanes in each direction.

AC Transit understands that the City wishes to make these changes to improve the pedestrian environment around Lake Merritt. AC Transit has been a strong supporter of the City's efforts to improve conditions for pedestrians throughout Oakland, not least because the great bulk of Oakland bus passengers walk to their bus stops. However, pedestrian improvements should not be achieved at the expense of transit passengers, who are often the very same people.

The importance of 12th Street Dam as a transit route cannot be overstated. Five bus routes (Lines 13,14,15, 40, 43, and 82/82L) connecting East Oakland with Downtown Oakland and other areas use the roadway. All but two of the bus routes that connect Downtown with East Oakland below Macarthur Boulevard use 12th Street Dam. There are up to 58 buses per hour—one per minute—that cross the dam. 12th Street is the location for the 1 Rapid bus, which will go into service next year, as well as the proposed location for the Bus Rapid Transit (BRT) line. 12th Street Dam is one of the busiest transit corridors in the entire Bay Area, and is the most important route segment in the AC Transit system after Broadway in Downtown Oakland.

Potential for Bus Delays on 12th Street
The reconstruction of 12th Street creates the potential for delay to buses, both during the several years of construction as well as with the final roadway. The capacity of 12th Street will be reduced by more than 50%, with the reduction in lanes and the introduction of new traffic signals on the dam. The EIR should analyze the likely impact of roadway changes on bus speeds both during construction period and with the final configuration.

Delay is the single most important potential impact to bus service and should be analyzed as such. Delay degrades service to passengers, many of whom are low and moderate income East Oakland residents. Sufficiently bad delays may lead to passengers switching to other modes, such as driving. Delay also has the potential to impose substantial costs on AC Transit itself. If travel delays disrupt bus schedules, it may be necessary to operate additional buses to maintain the "headway" (frequency) on the routes. The cost of adding just one full time bus is approximately $250,000-$300,000 per year. Small delays may force the addition of numerous buses because many bus routes are already tightly scheduled and there is little slack time in the schedules.

Cumulative Impacts of Delays to Transit
In addition to considering the potential impacts of delays because of the 12th Street project, the EIR should also consider the potential for cumulative delay-causing impacts. Cumulative impacts could occur if projects were implemented elsewhere along bus routes that cross the 12th Street Dam that also caused delay. These projects could potentially be implemented by the City of Oakland or other agencies.

The EIR should identify any future anticipated projects that would reduce bus travel speed on corridors served by buses which cross 12th Street Dam. These projects could include reductions in the number of lanes in order to provide bicycle lanes, traffic calming, or for other reasons. They could include changes in roadway width, configuration, signal timing, or other characteristics of a street. Buses which cross 12th Street Dam operate primarily on 11th Street, 12th Street, Foothill Boulevard, E. 15th Street, International Boulevard, Park Boulevard, Lakeshore Avenue, Martin Luther King Junior Way, and Telegraph Avenue.

The Foothill corridor (used by Lines 40 and 43) has been subject to several projects in recent years which have slowed bus operating times. These projects have already reduced AC Transit's ability to absorb further delays.

Mitigations to Traffic Delays: Bus Lane, Transit Signal Priority
One way to mitigate the impact on 12th Street traffic would be the creation of a dedicated bus lane from Oak Street to First Avenue across Lake Merritt. The EIR should evaluate an alternative or design option that provides a dedicated lane across the dam. The volume of bus activity and the importance of the route justify a dedicated lane. It would provide a connector between the proposed bus lanes in the Downtown Oakland and International Boulevard sections of the BRT.

Transit signal priority should also be analyzed and recommended for the new signals on the 12th Street Dam. Transit signal priority extends green time to allow a bus to pass through a signal, or shortens red time to limit delay at a signal. Transit signal priority is being used on San Pablo ., and will be used on International Boulevard and Telegraph Avenue with the startup of the Rapid. Transit Signal Priority would reduce signal delays for buses crossing the dam. It would be most effective in conjunction with a dedicated bus lane. Transit Signal Priority would still provide benefit without a bus lane, particularly if it were coupled with "queue jump" lanes at traffic signals, allowing buses to pull around queues of waiting cars.

Easterly Crosswalk at 12th Street/14th Street Intersection
The project proposes to add a traffic signal and crosswalks at the intersection of 12th Street and 14th Street on the dam. AC Transit is very concerned about the potential impact of the easterly crosswalk to the Lake side at this intersection, and believes it should be eliminated from further consideration. The intersection is roughly T shaped. To allow pedestrians to safely use the easterly crosswalk, all traffic movements in the intersection must stop. This is not true of the proposed westerly or southerly crosswalks. The easterly crosswalk does not provide direct access to any sites, leading only to a wall of the Oakland Museum.

Traffic analyses conducted before scoping have shown traffic backing up from this intersection through the 11th Street access tunnel as far as Oak Street. Such a backup would be detrimental to bus service, general vehicle traffic, and air quality. The potential impacts of the current intersection configuration lead us to strongly suggest elimination of the east side crosswalk.

Mitigations to Construction Traffic Delays
Construction period traffic impacts are a major concern for AC Transit. Because of the complexity and scope of the Measure DD projects, particularly around the 12th Street Dam, construction can be expected to last for several years. City and AC Transit staff have jointly identified and agreed upon a series of construction mitigations to be used in various phases of reconstruction of the 12th Street Dam and approaches to it. These mitigations were documented in meeting minutes and other written correspondence. (copies of the correspondence are attached to this letter). From the meeting minutes, we would particularly highlight reference to the importance of minimizing the time when buses are detoured onto 10th Street and 2nd Avenue. We also note the importance of conducting "short duration" work at night between 8:00 p.m. and 6:00 a.m.

Lakeside/Harrison/20th Street intersection
The project proposes to reconfigure the intersection of Lakeside, Harrison, and 20th Streets to improve pedestrian access to Lake Merritt. The project would eliminate the section of 20th Street between Lakeside Drive and Harrison Street to create parkland there. That segment of 20th Street is used by Line 59 which travels from Lake Merritt BART to the Pill Hill area and beyond. Line 59 would need to be rerouted, with potential impacts on streets it was rerouted to, such as loss of parking spaces to create bus stops. The potential for impacts on various streets in the Lakeside and "Gold Coast" neighborhoods should be discussed in the EIR.

Relationship to Grand/Macarthur Project
AC Transit is developing a plan for Transbay Rapid bus service on the Macarthur-Grand corridor in Oakland, continuing to San Francisco (the route of the current NL). Around Lake Merritt, the Rapid from East Oakland would run west on Grand Avenue, south on Harrison Street, then west on 20th Street/Berkley Way. In collaboration with the City of Oakland, AC Transit is preparing proposals for the physical changes necessary for Rapid operation. Along Harrison Street between Grand and 20th Street these include (but are not necessarily limited to) signal coordination/priority, a bus stop at Harrison & 21st Street and bus lanes along Harrison and 20th Street.

The EIR should acknowledge the planned Rapid as an anticipated project. The EIR should assure that nothing in the Measure DD project would interfere with the implementation of the Macarthur-Grand Rapid. If there are unavoidable conflicts, these should be noted as significant impacts, and appropriate mitigations developed in consultation with AC Transit.

AC Transit looks forward to continuing to work with the City of Oakland to assure that the Measure DD project is implemented in a transit supportive manner. If you have any questions about this letter, please contact Nathan Landau at 510-891-4792 or nlandau@actransit.org.

Sincerely,

Nancy M. Skowbo

Nancy Skowbo
Deputy General Manager for Service Development

Attachments

cc: Jim Gleich, AC Transit Deputy General Manager
Anthony Bruzzone, AC Transit Transportation Planning Manager
Tina Spencer, AC Transit Long Range Planning Manager
Jim Cunradi, AC Transit Senior Transportation Planner
Robert del Rosario, AC Transit Senior Transportation Planner
Nathan Landau, AC Transit Senior Transportation Planner

AC TRANSIT
1600 Franklin Street, Oakland, CA 94612 · Ph. 510/891-4722 · Fax. 510/891-7157

Zia Dairkee
Assistant General Manager - Architecture and Engineering

August 29, 2006

Jose Martinez, P.E.
CIP Coordinator
Public Works Agency
City of Oakland
250 Frank H. Ogawa Plaza
Oakland, CA 94612-2033

Re: 12th Street Reconstruction Project

Dear Mr. Martinez:

Thank you for meeting with representatives of AC Transit on August 22, 2006 to review and discuss the proposed construction staging/detours for the 12th Street Construction Project. It was an effective meeting and we appreciate the City's efforts to mitigate the impacts the project would have on AC Transit's service through this area. As discussed at this and prior meetings, about 850 buses per weekday operate through this corridor, including some of the new Rapid lines, and this service could have been significantly impacted by the project. However, with the cooperation of our two agencies solutions have been identified and agreed to that will minimize the adverse impact to AC Transit's service.

Enclosed are the minutes from the meeting and the proposed changes to the bid drawings that were discussed and agreed to at the meeting. The implementation of these changes will minimize construction delays to the District's service.

It was agreed that an Addendum Package would be prepared containing the agreed to construction staging drawings changes, as well as necessary changes to provide compatibility of the project's Transit Signal Priority System and Signal Interconnect with the Alameda County CMA SMART Corridor system. It was further agreed that the bid documents would be provided to AC Transit prior to its issuance to prospective bidders in sufficient time for AC Transit to review and comment on the Addendum Package. Please send the Addendum Package to my attention.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

If the minutes or the content of this letter do not agree with your recollection of the meeting, please contact me as soon as possible so that any misunderstandings or misinterpretations of our agreements can be resolved. You may contact me at 510.891.4722.

Again thank you for your efforts to effectively and amicably resolve the District's concerns.

Sincerely,

Zia S. Dairkee
Assistant General Manager – Architecture and Engineering

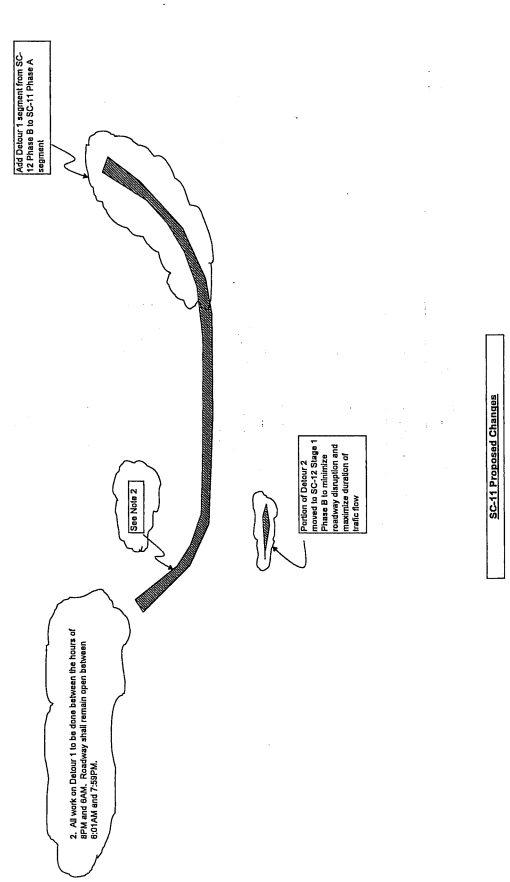
Enclosures: Meeting Minutes (August 22, 2006)
Drawings SC-6, 7, 11, 12 Proposed Changes

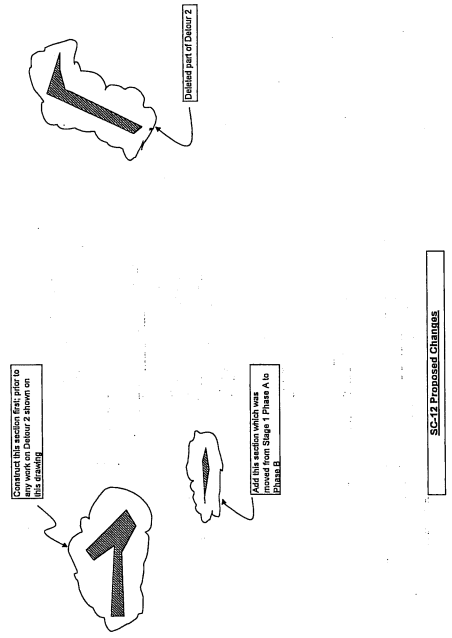
cc: Ade Oluwasogo, City of Oakland Public Works
Joel Peters, City of Oakland
Rick Fernandez, AC Transit, General Manager
Ken Scheidig, AC Transit, General Counsel
Nancy Skowbo, AC Transit, Deputy General Manager for Service Development
Jon Twichell, AC Transit, Manager of Capital Implementation
Greg Hunter, AC Transit, Transportation Manager
Cesar Pujol, AC Transit, Traffic Engineer

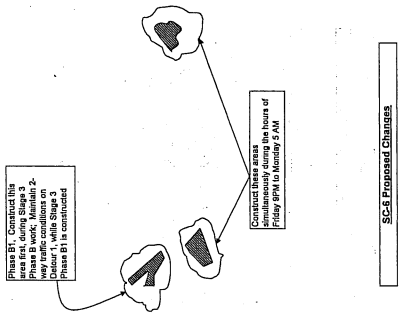
Meeting Minutes
8/22/2006
Discuss Detours on 12th Street Reconstruction Project
Jose Martinez (JM), Ade Oluwasogo (AO), Frank Awayan (FA) w/ City of Oakland
Zia Dairkee (ZD), Greg Hunter (GH), Russ Dibble (RD), Cesar Pujol (CP), Jon Twichell (JT) w/ AC Transit (ACT)

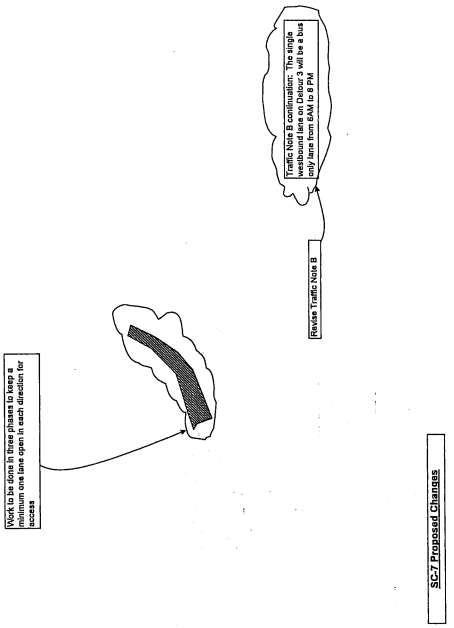
- JM will issue addendum in first week of September. City agreed to give ACT a minimum 3 days to review prior to issuing of the addendum
- There are six construction stages; each stage is approximately 100 days
- See attached shts SC-11 and SC-12 for ACT proposed changes, agreed to by JM. These two shts are preliminary to traffic being diverted onto the long term Detours 1 and 2.
  - Detour 1 runs adjacent to Lake Merritt, while Detour 2 runs adjacent to Oakland Museum/Kaiser Convention Center
  - Closure of Detours 1 and 2 at the same time adversely impact ACT. If either Detour 1 or Detour 2 is temporarily closed, then ACT was acceptable with diverting buses onto the detour that is open. This is preferable to detouring buses onto 10th Street and 2nd Ave. This was accepted in principle by JM.
  - There might be short term night detours or weekend detours where ACT will detour onto 10th Street and 2nd Ave.
- Sht SC-1 Temporary signal light at 12th St/East 12th Street will stay in plans & specifications
  - It's main intended function is to facilitate emergency vehicles and construction delivery trucks
  - AO will reassess need for this temporary signal and may choose not to install
  - If needed then City will provide minimum green for left turn of approximately 5 seconds. This will discourage vehicles from using this signal.
- City will reassess all temporary signal lights for transit impact and may choose not to install
  - For example, Sht SC-5 temporary signal at 13th/14th might not be necessary
- Sht SC-6 Stage 3 Phase B
  - There are three locations identified by Construction Note 1, for contractor to construct transition area from Detour 2 to Detour 3.
    - Detour 1, which is the roadway adjacent to Lake Merritt, will be kept operational in both directions, until the three transition areas are completed
    - These areas will be constructed from Friday 9 PM to Monday 5 AM
    - First location to be constructed should be transition at 13th Street/14th Street.

    - Afterwards, contractor can construct transition at 11th/12th/14th.
- Sht SC-7 Stage 3 Phase C
  - City agreed to not construct Lakeshore cul-de-sac until later stages
  - City also agrees westbound lane on Detour 3 will be bus only.
- Set SC-8 Stage 4
  - All vehicles are now on final roadway, while stage construction entails demolition of detours and construction of park areas.
  - ACT expressed concern that the southside crosswalk at 11th 12th/14th Street would adversely conflict with transit and this conflict may present potential safety issues.
  - JM agreed that southside crosswalk at 11th/12th/14th Street intersection will not be initially delineated and ped signal will not be activated during the construction of the park areas. This provides at least a year to observe the need for a southside crosswalk
- In general, to reduce adverse impact on ACT operations the City will try to do short duration work at night time from 8 PM to 6 AM









Thornton, Elois A

From: David.H.Sulouff@uscg.mil on behalf of Sulouff, David [David.H.Sulouff@uscg.mil]
Sent: Tuesday, January 16, 2007 3:46 PM
To: eathornton@oaklandnet.com
Cc: jerrys@acpwa.org; Eckerle, Tyson S SPN; Hicks, Jane M SPN; Paniccia, Al SPN; Fernwood, Roger A SPN; Dilgren, Richard A SPN; Ramos, Eric LT
Subject: MEASURE DD EIR SCOPING

EstuaryMerrittScopIng0107.pdf ...

Ms. Thornton:
The original of the attached .pdf will be mailed on 17 Jan 2007. Thank you,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
Bldg 50-2 Coast Guard Island
Alameda, CA 94501
(510) 437-3516

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

U.S. Department of Homeland Security
United States Coast Guard

Commander
District Eleven

U. S. Coast Guard Island, Bldg. 50-2
Alameda, CA 94501-5100
Staff Symbol: (dpw)
Phone: (510) 437-3516
Fax: (510) 437-5836

16590
Oak Inner Tidal Canal (5.6)
January 16, 2007

City of Oakland
Attn: Elois A. Thornton
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Madam:

Please include the Coast Guard Bridge Office concerning the Measure DD Environmental Impact Report (EIR) Project, for all bridge related issues over existing or proposed navigable waters of the United States.

The General Bridge Act of 1946 requires that the location and plans for bridges over navigable waters of the United States be approved by the Commandant, U. S. Coast Guard prior to commencing construction. The Oakland Inner Tidal Canal and the Oakland-Alameda Estuary are considered to be navigable waterways of the United States for bridge administration purposes. Coast Guard Bridge permitting is subject to the National Environmental Policy Act.

Lake Merritt and the portion of Lake Merritt Channel upstream from the impoundment are presently not considered navigable for bridge permitting purposes. However, alteration of the waterway to allow vessels to navigate between the lake and the estuary would result in a change to the determination and existing or proposed bridges would become subject to Coast Guard Jurisdiction.

Applications for bridge permits should be addressed to Commander, Eleventh Coast Guard District, Bridge Section, Bldg 50-2, Coast Guard Island, Alameda, CA 94501. Applications are available on-line at: http://www.uscg.mil/hq/g-o/g-opt/g-opt.htm. The application must be supported by sufficient information to permit a thorough assessment of the impact of the bridges and their immediate approaches on navigation and the environment. We recommend discussing the proposed impacts of procedures for constructing, altering or demolishing bridges. The Environmental Impact Statement should also contain data on the number, size and types of vessels using or projected to use the waterway.

We appreciate the opportunity to comment on the project in this early stage. I can be contacted by telephone at (510) 437-3516 if additional information is needed.

Sincerely,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
By direction of the District Commander

Copy: San Francisco Corps of Engineers
CG Sector, San Francisco

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

Maureen F. Gorsen, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

December 21, 2006

Ms. Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for the draft Environmental Impact Report (EIR) for the Measure DD Project (Project) (Case Number ER060017). As you may be aware, the California Department of Toxic Substances Control (DTSC) oversees the cleanup of sites where hazardous substances have been released pursuant to the California Health and Safety Code, Division 20, Chapter 6.8. As a Responsible Agency, DTSC is submitting comments to ensure that the environmental documentation prepared for this project under the California Environmental Quality Act (CEQA) adequately addresses any remediation activities pertaining to releases of hazardous substances.

According to the NOP, the Project would improve or provide new recreational opportunities in the City of Oakland, and improve water quality at Lake Merritt and in creeks located throughout the City. The Project includes the construction of a 6.6 mile segment of the Oakland Waterfront Trail, which will become part of the San Francisco Bay Trail. The proposed trail segment is located between Jack London Square and 66th Avenue. The NOP states that properties along the waterfront designated for parkland development by Measure DD would be acquired and remediated, as needed. A cleanup plan would be developed for each site where soil or groundwater is contaminated above risk-based cleanup standards. These plans would specify measures to be taken to protect workers, the public and the environment during remediation. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency.

For each waterfront property acquired by the City as part of the Project, DTSC strongly recommends an investigation into each property's current and historical uses, and a site assessment to determine whether hazardous substances may have been released into the soil at the site. Based on this information, sampling should be conducted to determine whether there is an issue that will need to be addressed in the CEQA compliance document.

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If hazardous substances have been released, they will need to be addressed as part of this project. For example, if remediation activities at the Site include the need for soil excavation, the CEQA compliance document should include: (1) an assessment of air impacts and health impacts associated with the excavation activities; (2) identification of any applicable local standards which may be exceeded by the excavation activities, including dust levels and noise; (3) transportation impacts from the removal or remedial activities; and (4) risk of public upset should be there an accident at the Site.

DTSC and the Regional Water Quality Control Boards (Regional Boards) signed a Memorandum of Agreement, March 1, 2005 (MOA) aimed to avoid duplication of efforts among the agencies in the regulatory oversight of investigation and cleanup activities at brownfield sites. Under the MOA, anyone requesting oversight from DTSC or a Regional Board must submit an application to initiate the process to assign the appropriate oversight agency. The completed application and site information may be submitted to either DTSC or Regional Board office in your geographical area. The application is available at http://www.calepa.ca.gov/brownfields/MOA/application.pdf.

If you have any questions or would like to schedule a meeting, please contact Allan Fone of my staff at (510)540-3836. Thank you in advance for your cooperation in this matter.

Sincerely,

Denise M. Tsuji, Unit Chief
Northern California - Coastal Cleanup
Operations Branch

cc: Governor's Office of Planning and Research
State Clearinghouse
P. O. Box 3044
Sacramento, CA 95812-3044

Guenther Moskat
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

ALAMEDA COUNTY
CONGESTION MANAGEMENT AGENCY

1333 BROADWAY, SUITE 220 • OAKLAND, CA 94612 • PHONE: (510) 836-2560 • FAX: (510) 836-2185
E-MAIL: mail@accma.ca.gov • WEB SITE: accma.ca.gov

AC Transit
Director
Dolores Jaquez

Alameda County
Supervisors
Nate Miley
Scott Haggerty
Chair

City of Alameda
Mayor
Beverly Johnson

City of Albany
Mayor
Alan Maris

BART
Director
Thomas Blalock

City of Berkeley
Councilmember
Kriss Worthington

City of Dublin
Mayor
Janet Lockhart

City of Emeryville
Mayor
Ruth Atkin

City of Fremont
Mayor
Robert Wasserman

City of Hayward
Mayor
Michael Sweeney

City of Livermore
Mayor
Marshall Kamena

City of Newark
Councilmember
Luis Freitas

City of Oakland
Councilmember
Larry Reid

City of Piedmont
Councilmember
John Chiang

City of Pleasanton
Mayor
Jennifer Hosterman

City of San Leandro
Mayor
Shelia Young

City of Union City
Mayor
Mark Green
Vice Chair

Executive Director
Dennis R. Fay

January 10, 2007

Ms. Elois Thornton
Planner IV
Community and Economic Development Agency
City of Oakland Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

SUBJECT: Comments on the Notice of Preparation for a Draft Environmental Impact Report (DEIR) for the Measure DD Project in the City of Oakland

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Notice of Preparation for a Draft Environmental Impact Report (DEIR) for the Measure DD Project in the City of Oakland. Passed by voters in 2002, Measure DD authorizes the City to issue bonds that fund two types of activities or actions that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. Major activities funded by Measure DD are: Lake Merritt and Lake Merritt Channel, Oakland Waterfront Trail and Access, East and North Oakland Recreational Facilities and Citywide Creeks. Of the above, activities that may potentially impact the regional transportation network are Lake Merritt Channel improvements and East and North Oakland Recreational Facilities.

The ACCMA respectfully submits the following comments:

- The City of Oakland adopted Resolution No. 69475 on November 19, 1992 establishing guidelines for reviewing the impacts of local land use decisions consistent with the Alameda County Congestion Management Program (CMP). Based on our review of the NOP, the proposed project, particularly the components related to East and North Oakland Recreational Facilities appear to generate at least 100 p.m. peak hour trips over existing conditions. If this is the case, the CMP Land Use Analysis Program requires the City to conduct a traffic analysis of the project using the Countywide Transportation Demand Model for projection years 2010 and 2025 conditions. Please note the following paragraph as it discusses the responsibility for modeling.

- The CMA Board amended the CMP on March 26th, 1998 so that local jurisdictions are now responsible for conducting the model runs themselves or through a consultant. The City of Oakland and the ACCMA have signed a Countywide Model Agreement on March 22, 1999. The Countywide model, updated incorporating ABAG's revisions to the employment data for Projections 2002, is available to the local jurisdictions for this purpose upon request.

- Potential impacts of the project components related to Lake Merritt Channel improvements and East and North Oakland Recreational Facilities on the Metropolitan Transportation System (MTS), including cumulative impacts need to be addressed (See 2005 CMP Figures E-2 and E-3 and Figure 2). The DEIR should address all potential impacts of the project on the MTS roadway and transit systems. These include (1) 14th Street, Harrison Street, 1st Avenue, E.18th and International Boulevard regarding Lake Merritt Channel improvements; and (2) I-880, Hegenberger Road, International Boulevard, San Leandro Street and 98th Avenue as well as BART and AC Transit regarding East and North Oakland Recreational Facilities. Potential impacts of the project must be addressed for 2010 and 2025 conditions.
  - Please note that the ACCMA does not have a policy for determining a threshold of significance for Level of Service for the Land Use Analysis Program of the CMP. Professional judgment should be applied to determine the significance of project impacts (Please see chapter 6 of 2005 CMP for more information).
  - In addition, the adopted 2005 CMP requires using 1985 Highway Capacity Manual for freeway capacity standards.

- The adequacy of any project mitigation measures should be discussed. On February 25, 1993 the CMA Board adopted three criteria for evaluating the adequacy of DEIR project mitigation measures:
  - Project mitigation measures must be adequate to sustain CMP service standards for roadways and transit;
  - Project mitigation measures must be fully funded to be considered adequate;
  - Project mitigation measures that rely on state or federal funds directed by or influenced by the CMA must be consistent with the project funding priorities established in the Capital Improvement Program (CIP) section of the CMP or the Regional Transportation Plan (RTP).

  The DEIR should include a discussion on the adequacy of proposed mitigation measures relative to these criteria. In particular, the DEIR should detail when proposed roadway or transit route improvements are expected to be completed, how they will be funded, and what would be the effect on LOS if only the funded portions of these projects were assumed to be built prior to project completion.

- Potential impacts of the project on CMP transit levels of service must be analyzed. (See 2005 CMP, Chapter 4). Transit service standards are 15-30 minute headways for bus service and 3.75-15 minute headways for BART during peak hours. The DEIR should address the issue of transit funding as a mitigation measure in the context of the CMA's policies as discussed above.

- The DEIR should also consider demand-related strategies that are designed to reduce the need for new roadway facilities over the long term and to make the most efficient use of existing facilities (see 2005 CMP, Chapter 5). The DEIR should consider the use of TDM measures, in conjunction with roadway and transit improvements, as a means of attaining acceptable levels of service.

Thank you for the opportunity to comment on this Notice of Preparation. Please do not hesitate to contact me at 510/836-2560 ext. 24 if you require additional information.

Sincerely,

Saravana Suthanthira
Associate Transportation Planner

file: CMP - Environmental Review Opinions - Responses - 2007

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5513
TTY (800) 735-2929

Flex your power!
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January 10, 2007

ALA000223
SCH#2006122048

Ms. Elois Thornton
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

Measure DD Project, Case #ER060017 – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the environmental review process for the Measure DD Project. The following comment is based on the Notice of Preparation for a Draft Environmental Impact Report.

The U.S. Army Corps of Engineers will be issuing a Section 404 permit for the Lake Merritt Channel Project. Therefore, it is subject to compliance with the National Historic Preservation Act. There is a known prehistoric site that may be within or adjacent to State right-of-way (ROW). Prior to any construction activities within State ROW, the Department's District 4 Office of Cultural Resources will need a copy of the Section 106 cultural resource compliance studies and documentation prior to the issuance of an encroachment permit.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans (in metric units) which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: Michael Condie, Mail Stop #5E.

Should you require further information or have any questions regarding this letter, please call Lisa Carboni of my staff at (510) 622-5491.

Sincerely,

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

"Caltrans improves mobility across California"

STATE OF CALIFORNIA
Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

January 9, 2007

Elois Thornton
City of Oakland
250 Frank H. Ogawa Plaza Suite 3315
Oakland, CA 94612

RE: Measure DD Project, SCH# 2006122048

Dear Mr. Thornton:

As the state agency responsible for rail safety within California, we recommend that any development projects planned adjacent to or near the rail corridor in the City be planned with the safety of the rail corridor in mind. New developments may increase traffic volumes not only on streets and at intersections, but also at at-grade highway-rail crossings. This includes considering pedestrian circulation patterns/destinations with respect to railroad right-of-way.

Safety factors to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to increase in traffic volumes and appropriate fencing to limit the access of trespassers onto the railroad right-of-way. Any project that includes a modification to an exiting crossing or proposes a new crossing is legally required to obtain authority to construct from the Commission. If the project includes a proposed new crossing, the Commission will be a responsible party under CEQA and the impacts of the crossing must be discussed within the environmental documents.

Specific concerns include the proposal to build a bicycle/pedestrian path along the Lake Merritt channel which includes a crossing of the Union Pacific Railroad mainline. This crossing must be grade-separated. Bicycle/pedestrian improvements are also needed at the rail crossing at 5th and Embarcadero.

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Terrel Anderson, Union Pacific Railroad

EAST BAY REGIONAL PARKS PARK DISTRICT

January 5, 2007

Eloise Thornton
Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: City of Oakland, Measure DD Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR), Case Number ER060017

Dear Ms. Thornton:

East Bay Regional Park District ("District") has received the NOP for the DEIR for the Measure DD Project and would like to make the following comments. The District's existing parks and trails under District maintenance and management in the Measure DD project area include the Martin Luther King Jr. Regional Shoreline Park, a 1,220-acre park leased from the Port of Oakland, and the paved multi-use San Francisco (SF) Bay Trail within the Park, which extends from Hegenberger Avenue to less than a quarter mile south of the High Street Bridge. The District also manages and maintains the 66th Avenue Staging and connector trail to the SF Bay Trail from Zhone Way.

Regarding the Oakland Waterfront Trail and Access proposed project boundaries, the District currently operates and maintains the SF Bay Trail from 66th Ave. north to the East Creek Point at Tidewater. In order to complete a trail link from this location to the High Street Bridge, the District is currently evaluating the potential for a non-motorized bicycle and pedestrian inland route along Tidewater Rd. to connect with the High Street Bridge. The project would include a signalized crossing of the Bridge intersection which would allow trail users a safe north-south crossing location. This segment would transition to the existing City of Oakland segment of trail on the north side of the bridge. The Boathouse is also a part of the Tidewater project which includes a segment of SF Bay Trail along the property's frontage with the Bay. The City of Oakland proposed access and overlook improvements at 66th Avenue will require review and approval by the District.

Regarding the proposed Oak to Ninth Development plan, a quality public access plan for the shoreline would include a well-designed SF Bay Trail segment across the development site.

Thank you for the notice of preparation and opportunity to provide scoping comments for the DEIR. Should you have any additional comments, please do not hesitate to call me at (510) 544-2611

Sincerely,

Jamie Perkins
Senior Planner, Regional Trails Department

cc: Lee Huo, SF Bay Trail

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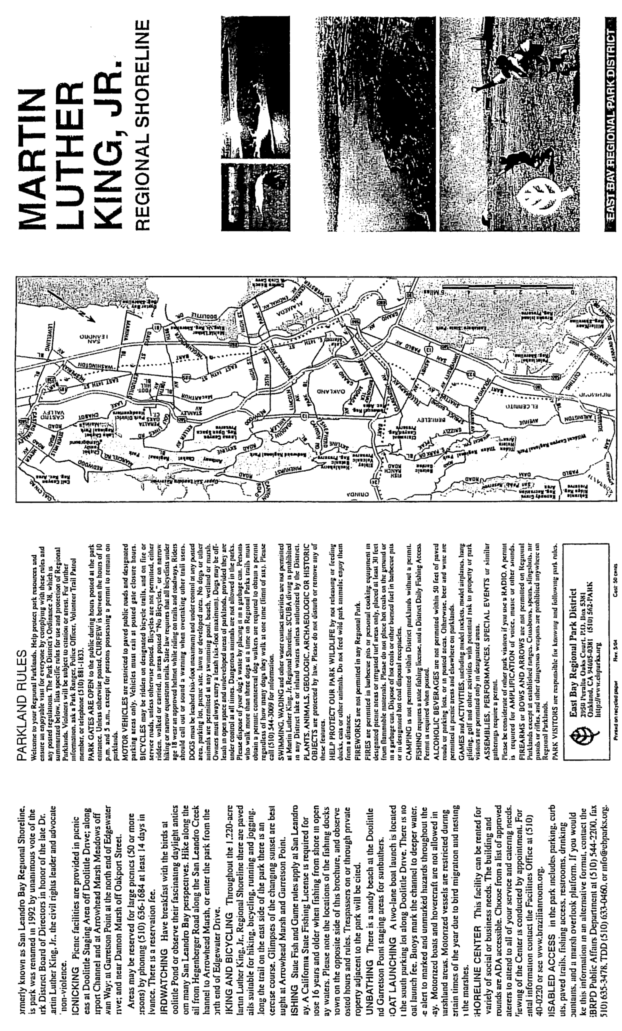
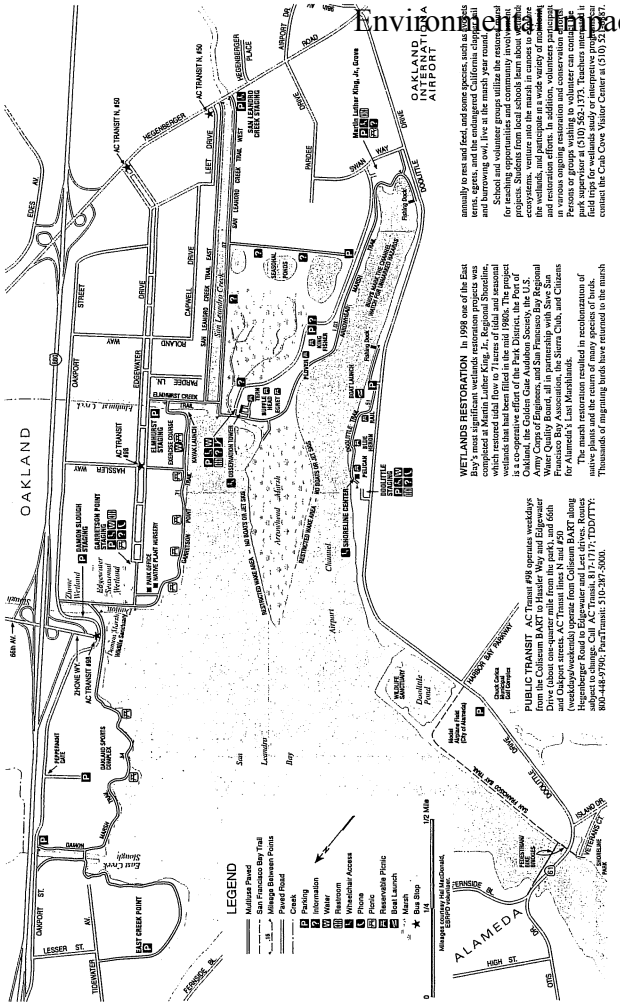




EAST BAY MUNICIPAL UTILITY DISTRICT

December 29, 2006

Elois Thornton, Planner IV
City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: Notice of Preparation of a Draft Environmental Impact Report – Measure DD Project, Oakland

Dear Ms. Thornton:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report (EIR) for the Measure DD Project in the City of Oakland (City). EBMUD has the following comments.

WATER SERVICE

EBMUD's Central and Pressure Zone, with a service elevation range of 0 to 100 feet, and Aqueduct Pressure Zone, with a service elevation range of 100 to 200 feet, serve the area incorporated in the Measure DD Project. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine the costs and conditions of providing water service to the project. Engineering and installation of water mains and services requires substantial lead time, which should be provided for in the project sponsor's development schedule.

WASTEWATER

EBMUD's Main Wastewater Treatment Plant is anticipated to have adequate dry weather capacity to treat the proposed wastewater flow from the projects included in Measure DD, provided this wastewater meets the standards of EBMUD's Environmental Services Division. However, the City's Infiltration/Inflow (I/I) Correction Program set a maximum allowable peak wastewater flow from each subbasin within the City and EBMUD agreed to design and construct wet weather conveyance and treatment facilities to accommodate these flows. EBMUD prohibits discharge of wastewater flows above the allocated peak flow for a subbasin because conveyance and treatment capacity for wet weather flows may be adversely impacted by flows above this agreed limit. The developers for these projects need to confirm with the City's Public Works Department that there is available capacity within the subbasin flow allocation and that it has not been allocated to other developments. The projected peak wet weather wastewater flows from

this project need to be determined to assess the available capacity within the subbasin and confirmation included in the environmental documentation. Suggested language to include in the environmental documentation is as follows: "The City of Oakland Public Works Department has confirmed that there is available wastewater capacity within Subbasin (insert subbasin number here) that is reserved for these projects."

In general, each project should address the replacement or rehabilitation of the existing sanitary sewer collection system to prevent an increase in I/I. Please include a provision to control or reduce the amount of I/I in the environmental documentation for this project. The main concern is the increase in total wet weather flows, which could have an adverse impact if the flows are greater than the maximum allowable flows from this subbasin.

It should also be noted that EBMUD's San Antonio Creek (SAC) Wet Weather Facility, SAC dechlorination facility, SAC discharge line and South Interceptor are located by the Lake Merritt Channel near the outlet to the estuary. The two pipelines run along Embarcadero and are above-ground as they cross the channel. The Oakland Waterfront Trail appears to run along side EBMUD's Oakport Wet Weather Facility and the SAC dechlorination facility. The Oakport facility is used to treat wet weather flows and serves as an equipment storage area. The existing Oakport and San Antonio Creek facility usages should be kept in mind when evaluating the visual impact along the trail. Any work in these areas should be coordinated with EBMUD.

WATER RECYCLING

EBMUD's Policy 8.01 requires that customers use non-potable water for non-domestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant life, fish and wildlife to offset demand on EBMUD's limited water supply.

In March 2002, the City adopted a dual plumbing ordinance, requiring new developments within the City to use recycled water provided by EBMUD and install separate plumbing systems for appropriate recycled water uses if recycled water will be available. The 12th Street Reconstruction component in the Lake Merritt and Lake Merritt Channel group of the City's Measure DD Project is located within the service area boundary of EBMUD's East Bayshore Recycled Water Project. EBMUD anticipates recycled water delivery to the 12th Street Reconstruction project area by mid 2007 and recommends that the City coordinate and consult with EBMUD regarding the installation of separate plumbing systems for use of recycled water for landscaping irrigation through the project area.

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD would request that the City include in its conditions of approval a requirement that the project sponsor comply with the Landscape Water Conservation Section, Article 10 of Chapter 7 of the Oakland Municipal Code. EBMUD staff would appreciate the opportunity to also meet with applicant's staff. A key objective of this discussion will be to explore timely opportunities to expand water conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:TNS:sb
sb06_478.doc

January 3, 2007

Dear Planning Commissioners,

I am writing on behalf of the "No Clear Cut Group." We are a citizen advocacy group that was created in November 2005 to advocate for the saving of mature Lake Merritt trees threatened by the DD plans. We are submitting to you suggestions that should be included in the general scope of the new EIR.

Not only do we have concerns, but as you will see, we have provided possible alternatives for your consideration.

Our comments are not limited to trees. We have positive suggestions for the Lakeshore configuration, jogging paths, bike paths, the channel and the Embatcadero street closures.

We appreciate your consideration in this matter.

Sincerely,

Nancy Rieser

Nancy Rieser
"No Clear Cut" Group
437 Euclid Ave #10
Oakland, CA
510-465-0928

PAGE 03

A. EVALUATION OF THE LAKE MERRITT TREES:

It is clear that the City, as part of the EIR process HAS to HIRE a qualified arborist who can do a comprehensive, independent evaluation which should include but not be limited to:

- Alternatives to the removal of trees for the convenience of contractors and/or inflexible landscape designers
- Recommendations for mitigative practices that both protect the health of the tree during construction and enhance its overall health and live span
- In additional to tree health analysis, the arborist should also calculate the economic and environmental value of the existing trees, to include, but not be limited to:
  - prevention of soil erosion and water run-off
  - improvement of water quality
  - removal of air pollution particulates and carbon dioxide emissions
  - economic enhancement of local property values

These economic and environmental values can easily be calculated using methods developed by UC Davis' Department of Urban Forestry and which are commonly used by municipalities and universities across the United States and Canada.

It is important to note, that the City did not do this important process in its last EIR. One week AFTER the City Council denied our tree permit appeal (late June of 2006) one of our Clear Cut members finally reached professional arborist by phone, Professor Louis Costello, whom the City claimed to have hired to evaluate the Lake Merritt trees. Professor Costello works at UC Davis in the Department of Urban Forestry.

Professor Costello stated he never wrote a report for the City and only had a relatively brief, informal walk-through (one hour) and saw a limited number of Lake Merritt trees. The second hour he spent in another part of the City, looking at the Dimond Park Champaign Oak Tree. He did not advise cutting any Lake Merritt trees unless they were clearly dead. (The dead trees around Lake Merritt of were very limited in number (a handful.)

However this current staff report still maintains that the trees are diseased and/or are at the end of their life spans, despite the lack a formal evaluation and report. This lack of science based evidence needs to be rectified.

B. REDESIGN OF BIKE PATHS:

Explore alternate path designs for recreational users (as opposed to those who would use the street bike lane. In community meetings and in Letters to the Editor, bicycle group representatives objected to any path that would sacrifice trees and instead supported the idea of a curving bike path design. We concur and further believe that a new design that allowed bikers to meander gently around trees would:

- make recreational biking through the park a more aesthetically pleasing experience
- slow down the speed of recreational bikers who share the park with other users
- echo the existing historical park design
- protect the existing heritage trees

C. JOGGING PATH ALONG LAKESHORE: Consider preserving the informal jogging path that currently seems to adequately meet the needs of joggers who don't run next to the water or who need to jog around the occasional walker on the sidewalk.

The City's lack of awareness of this existing path may be the explanation behind it's posting of the DD Park Improvement sign in the middle of the path.

Joggers who prefer high speed running and find navigating around an occasional sidewalk pedestrian an impediment to their sport, usually use choose to use running tracks at nearby high schools and community colleges.

D. REDESIGN OF LAKESHORE AVENUE: The Plan of redesigning Lakeshore Avenue needs to look at alternatives that take the viewpoint of residents and park users – not just the bicyclists and motorists.

The Lakeshore re-configuration presumes that all pedestrian/car conflicts are due to speed alone. *This is not true.*

Pedestrians who use the unsignaled crosswalks at Boden Way, in front of Our Lady of Lourdes Church complain of difficulty crossing the street due to motorists not stopping or slowing down ***unless a stop light or caution light tells them to do so.*** Pedestrians further up Lakeshore near the Lake Merritt United Methodist Church complain of the lack of signalized crossings.

This problem can be easily corrected by the use of push button operated, yellow-flashing, "pedestrian caution" lights. There are models that are solar powered, use LED lights, are easy to install and are low maintenance. Further, the initial purchase costs of these safety signs are inexpensive compared to standard street lights (models usually run only $3,000) and only would be operated as needed.

This safety addition would NOT impact the proposed Lakeshore re-configuration and/or proposed bike lanes. It simply provides pedestrians a means to alert drivers who are not mindful of crosswalks and/or who may be distracted.

E. THE CHANNEL: HOW NAVIGABLE DOES IT NEED TO BE? WHERE SHOULD THE WETLANDS RESTORATION PROJECT BE LOCATED?

The planning commission is already aware of fairly serious easement issues with Union Pacific, EBMUD, BART, Alameda County Flood Control District and Port of Oakland. On top of the right-of-way issues, there is the mind-numbing expense of making the Flood Control station into something more user friendly for a small number of recreational boaters.

We say small number, because the close proximity of the high tidal waters the two Railroad trestles, Port of Oakland jet fuel lines and the EBMUD high pressure sewer lines make the passage of any vessel with a mast impossible. Only kayakers and operators of very small boats without sails can cautiously pass under the RR trestles – and can only do so if they duck. (See attached photos.)

The tidal changes severely limit water passage for boaters. At regular high tide, one can float from the lake down the channel. However, at extreme high tides the water covers the RR trestles. At low tide, much of the channel is ankle deep – or in some spots – just a series of puddles at severe low tide. It can't be dredged to be made deeper, either. The BART tube to Fremont runs underneath the channel near Laney college. At low tide, a person can actually stand on the outside/top of the BART tube (see photo).

Does the channel need to be "accessible" 24/7? No, say experience kayakers. They understand tide tables and plan accordingly.

The biggest impediment is NOT the flood gates. They open and close and for the most part stay open unless a predicted severe storm will collide with a high tide.

The big impediment is the garbage grilles on either side of the floodgates. No one is arguing that garbage should not be collected or caught in some fashion. Could the answer be as simple as examining whether the serious underwater grilles are now redundant?

RECOMMENDATION: Now that we have creek catchment/control systems up stream that probably are sufficient to block submerged logs from the watershed from floating down stream (and potentially out into the harbor to damage boats) perhaps we could consider removing the stationary grilles and replace them with movable/cleanable net system that can collect the usual flotsam and jetsom and allow period passage of small boats. Creating a side channel may be possible, but extremely expensive in that it will need its own set of flood gates, according the Alameda County Flood Control District.

F. MARSHLAND RESTORATION: THE EIR SHOULD EXAMINE ALTERNATE SITES IN THE CHANNEL AND THEREBY SAVE THE STAND OF REDWOODS

Previously, the channel in front of Laney College was a vibrant marshland that was used by the Science Department of the Oakland Museum as a living science lab. Even though the original channel was actually the width of Lake Merritt and much of it is covered over by the Convention Center, Laney College and the Museum of California, what was left over eventually became a verdant marshland.

The native pickle grass was other vegetation was pulled out and replaced with ornamental ice plant over and above the protestations of the local biologists. Ironically, the tearing out of the natural marshland was funded by....a bond measure. Now what is left in that location is ice plants and mudflats.

The City has approached an independent agency for a grant to restore marshland in an area that is now built up with bay fill. At risk are a stand of Redwood trees that provide nesting sites to protected raptors further up the channel next to the lake. Not only is this site not desirable in light of the threat to the native trees, but biologists wonder if the older fill dirt in that area actually has the organic components to support marshland restoration.

Why not move the marshland restoration project down to the area where marshland was ripped out by the city 25 years ago? We know the mud has the organic compounds necessary for the plants. That part of the channel does not need to be dredged nor or does its banks to be sloped or carved. With this bond measure money, we can fix a past mistake AND deliver the project at the foot of the Laney College Science Department that has expressed an interest in collaborating in this restoration matter.

G. Alternate street closure plans for the Green Link park expansion plan.

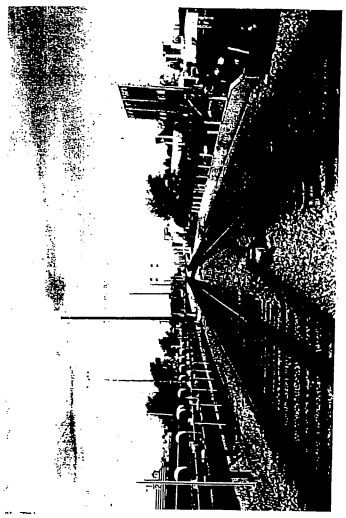
The current plans were created without input from the Library staff or patrons. The proposed street closure will double the traffic, noise and pollution under the Library windows. The negative conditions have been objected to by both library staff and the Friends of the Lakeview Library in the form of letters, one-on-one meeting with council members and in front of the entire City Council. However, the City, thus far, has not budged from its position nor expressed regret that input from the one user group most negatively impacted was not sought out and incorporated into the planning process.

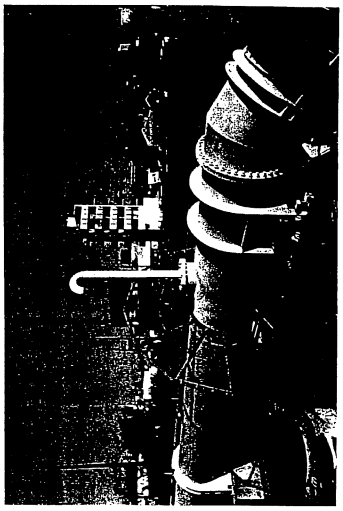
We feel that the EIR should examine at least two more options:

1. Closing the leg of the Embarcadero closest to the library instead of closest to the lake instead of the one closest to the library.

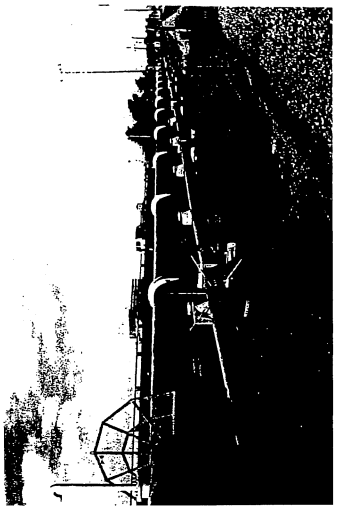
2. Keeping both legs of Embarcadero open Monday through Friday (avoiding commuter headaches) yet closing both legs *at the same time* on the weekends, much like Kennedy Drive in San Francisco's Golden Gate Park. This option would create a completely car-free zone for two days a week -- the weekend, which is the time when the park is used the most.

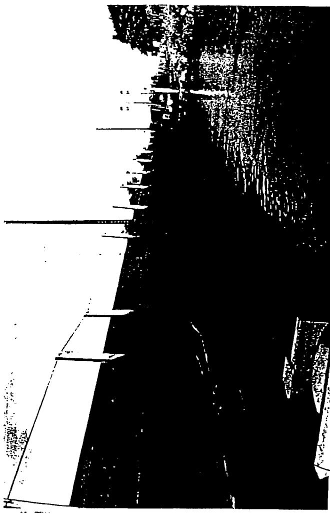
EBMUD high pressure sewer lines, RR trestle...jet fuel lines running from the Port to the Airport are just a foot off the water at high tide and at extreme high tides the water actually reaches the utilities.



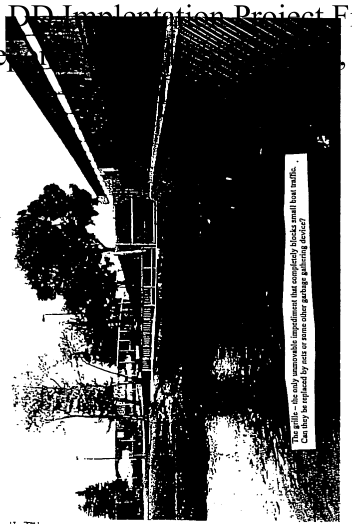


EB MUD

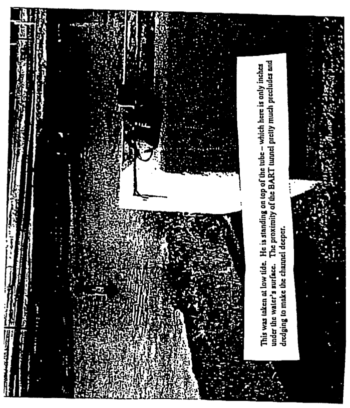


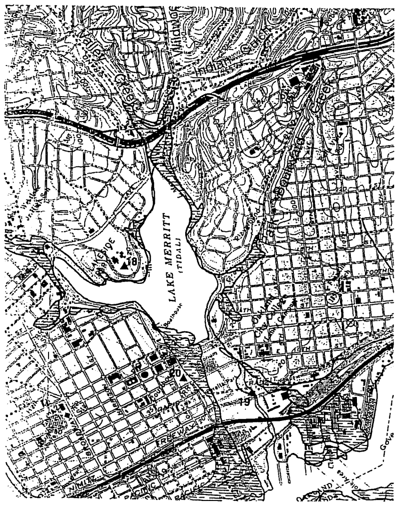


Jet fuel lines



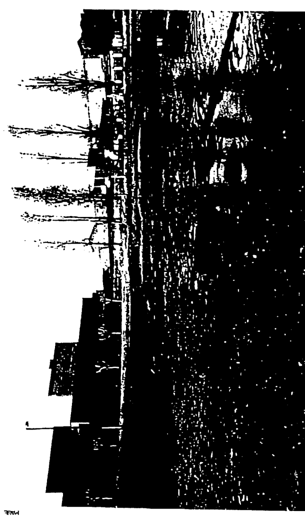
This should be the preferred site for revegetation'



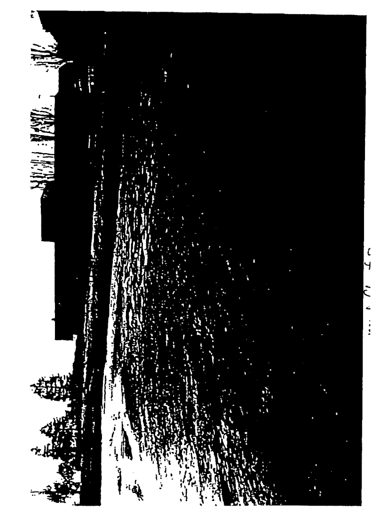


Marshland destroyed by Previous Bond Measure
(Laney College)

Natural slope needing re vegetation



Mudflats



Thornton, Elois A

From: Mary Eileen Farrell [mepf@pacbell.net]
Sent: Tuesday, January 23, 2007 1:33 AM
To: eathornton@oaklandnet.com; dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com; gofindnancy@yahoo.com
Subject: Measure DD Impact on Lakeview Library

Hello,

This email is to let you know that if the El Embarcadero streets are changed the way that Measure DD plans, the noise and air pollution will be increased for the public and staff at Lakeview Branch Library.

People from the library were not included in the original public discussions on these changes and did not know until the city was ready to implement the changes, that the road configuration would be changed. The library had no input into Measure DD decisions.

Currently the traffic is so noisy that programs are interrupted. Windows have to be open for ventilation. The prevailing breezes come from Lake Merritt into the library bringing noise and air pollution into the library.

Once the changes are implemented, four lanes of traffic will be compressed into three lanes and moved two feet closer to the library. There will be two stop lights at either end of El Embarcadero, causing traffic to idle while stopped, causing air pollution and noise pollution to be concentrated right in front of the front door of the library.

The library conducts children's and adult programs in the space in front of our front door. Concentrating all the traffic into three lanes and moving them two feet closer to our front door can put library patrons in jeopary.

With the traffic concentrated in this fashion, it will be more difficult for pedestrians to cross to our library. Over 1/2 of Lakeview's patrons are pedestrians.

We urge the Planning Commission to reconsider this part of the Measure DD plan.

Alternate choices could be:

Consolidate the traffic and put it on the branch of El Embarcadero which is closer to the lake,

or

Make all the space between the library's front door and the lake green space,

or (the most cost effective plan)

Leave the roads as they are and block them to traffic

on weekends, making the two branches of El Embarcadero public, pedestrian and assembly spaces on weekends.

Thank you for considering these comments.

Mary Farrell

Thornton, Eloi s A

From: mattmcfarland@earthlink.net
Sent: Monday, January 22, 2007 4:52 PM
To: eathornton@oaklandnet.com
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; amudge@coxcastle.com; mlighty@calnurses.org; mzm@ionix.net
Subject: Comments on Measure DD Project NOP

Measure DD omment Letter.pdf

Dear Ms. Thornton,

Please find attached Comments on the Notice of Preparation for the Measure DD Project. The comments are submitted by Friends of the Lake, David Mix, Gloria Pieretti and Therese George.

Thank you for allowing the public the opportunity to comment.

very truly yours,

Matt McFarland
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA 94105
(415) 442 - 0711 Phone
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LAW OFFICES OF BRIAN GAFFNEY

605 Market Street, Suite 505 **(415) 442-0711 Phone**
San Francisco, CA 94105 **(415) 442-0713 FAX**

FAX MEMO

TO: Eloise Thornton, Fax: (510) 238-6538
DATE: January 22nd, 2007
RE: Comments on Notice of Preparation for the Measure DD Project.
PAGES TO FOLLOW: 7

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LAW OFFICES OF BRIAN GAFFNEY

605 Market Street, Suite 505, San Francisco, CA 94105
(415) 442- 0711 Phone **(415) 442-0713 Fax**

January 22, 2007

Via Facsimile and Electronic Mail

Eloise Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA. 94612
facsimile: 510-238-6538
eathornton@oaklandnet.com

RE: Comments on Notice of Preparation for the Measure DD Project

Dear Ms. Thornton,

This office represents Friends of the Lake, David Mix, Gloria Pieretti and Therese George (collectively "Friends of the Lake") regarding the Notice of Preparation ("NOP") for the proposed Measure DD project. On August 7, 2006, Friends of the Lake filed suit against the City of Oakland ("the City") in the Alameda Superior Court. The action challenged the failure of the City to conduct proper environmental review with respect to the granting of three Tree Removal Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006). The action also challenged the certification of the Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR"), which avoided discussion of tree removal impacts and failed to adequately analyze the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. Because the Measure DD project includes Lake Merritt Channel alterations that will result in the removal of protected trees, Friends of the Lake submits these comments.

The City's previous decision to grant the three Tree Removal Permits is contradicted by substantial evidence in the record, did not follow the procedure required by California Environmental Quality Act ("CEQA"), and was not supported by adequate Findings as required by CEQA and California Code of Civil Procedure section 1094.5. In addition, the City's reliance on the June 2002 Measure DD Initial Study ("Initial Study") prior to granting the Tree Removal Permits is improper as the Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

Likewise, the City failed to proceed in the manner required by law when certifying the Lake Merritt Channel Wetlands and Widening Project EIR. The EIR (1) fails to accurately describe the project as including the removal of all trees authorized by the Tree Removal Permits; (2) fails to include an accurate project description or to adequately describe the environmental setting; and (3) fails to make

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

adequate findings with respect to each significant effect identified by the EIR. Specifically, the findings are inadequate as they do not explain how proposed mitigations will mitigate the channel widening project, do not explain why the facts in the record support the proposed mitigations, do not provide a logical explanation establishing the relationship between the findings and the evidence, and are not supported by substantial evidence.

Further, the EIR fails to adequately analyze the Channel Wetland and Widening Project's significant environmental impacts—including an inadequate analysis of cumulative impacts. In addition, there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts. The EIR also fails to adequately analyze alternatives and improperly tiers to the 2002 Initial Study.

Finally, in granting the Tree Removal Permits and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

In preparing the Draft EIR for the Measure DD project, Friends of the Lake encourages the City to engage in proper environmental review so as to avoid the failures inherent in both the previous granting of the Tree Removal Permits and the certification of the Lake Merritt Channel Wetlands and Widening Project EIR. Filing of the above-mentioned action, Friends of the Lake believes, was a catalyst for the initiation of the Measure DD EIR noticed by the NOP. Hopefully, the City will now correct the previous deficiencies.

Please continue to include both this office and Friends of the Lake, in any further communications to the public on this proposed project. Thank you for affording the public this opportunity to comment.

Sincerely,

Matt McFarland

cc: Friends of the Lake
Doug Boxer (dboxer@gmail.com)
Michael Colbruno (michaelcolbruno@clearchannel.com)
Suzie Lee (suzie@yhla.net)
Michael Lighty (mlighty@calnurses.org)
Anne Mudge (amudge@coxcastle.com)
Madeleine Zayas Mart (mzm@ionix.net)

Thornton, Elois A

From: Nancy Rieser [gofindnancy@yahoo.com]
Sent: Monday, January 22, 2007 5:43 PM
To: Nancy Rieser; eathornton@oaklandnet.com; Gloria Pieretti
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Subject: Re: PDF of lawsuit

Dear Ms. Thornton and Commissioners:

I thought I would just add one suggestion to the Kayaking issue and boat access in my previous packet I submitted a two weeks ago.

1. CUTTING THROUGH A SOFT CUBE OF BUTTER WITH A CHAIN SAW:

In more conversations with boaters I learned that this is what Kayakers and river rafters do who face any impediment in a stream, river or channel that their boat cannot navigatge through (such as heaps of bolders, waterfalls or excessively low stretches of water): they simply lift up their lightweight, water craft....and walk around the impediment and, once on the other side, they drop their boat in the water and off they go. The word they use is "portage".

So my question is...why can't kayakers do the same around the pump station? I refer you to one of the photos in the packet sumitted to the Commission a two weeks back. It is of the gentleman standing in the middle of the channel on top of the BART tube, ankle deep in water. Between him and the large concrete block where his shoes are resting is a gently sloping bank. He walked down there in his bare feet.

That piece of bank in the EXACT part of the bank where kayaking portage would occur. Out of the picture frame, immediately to the left, is the pump house.

One wouldn't have to even construct a path.

So it seems that building a by pass channel AND a separate set of flood gates to let the (very) occasional kayaker float through is insanely expensive and over the top.

Kayakers know how to portage. Let them walk around the pump house as if it was a big pile of rocks.

2. THE GARBAGE GRILL APPARENTLY NEEDS TO STAY PUT

It catches the flotsam and getsam that would get into the pump house machinery. However, there are spaces between the forks underneath the water to allow big fish through (every other tong was removed for that purpose.) It's not big enough to allow a harbor seal to get through or a great white shark, but is ample for the larger fish, which in fact, have been caught in the lake in times past, when fishing was allowed.

The new EIR should reflect some kind of consensus from the professional,

1/23/2007

experienced boating community as to the most practical and econonomic way for making the channel accessible to kayakers.

Respectfully submitted,

Nancy Rieser
437 Euclid Ave #10
Oakland, CA 94610

----- Original Message -----
From: Nancy Rieser <gofindnancy@yahoo.com>
To: eathornton@oaklandnet.com; Gloria Pieretti <gpieretti@sbcglobal.net>
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Sent: Monday, January 22, 2007 4:42:19 PM
Subject: Fw: PDF of lawsuit

Dear Ms. Thorton,

I am submitting this on behalf of Gloria Pierett, whose computer is not cooperating with her today! She was able to send this letter to me before all heck froze.

She is a collegue of mine in the Merritt Lakesiders and the No Clear Cut Group and is at the core of the Friends of the Lake Lawsuit which inspired the City to start the EIR process from scratch. Her letter is below and the lawsuit is appended as an attachment. She would like the entire lawsuit (21 pages) to be part of the record.

I will be hand delivering a hard copy of the letter and the attachment to the Planning Department momentarily.

Nancy Rieser

Nancy Rieser

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

Dear Ms. Thornton

As a concerned citizen who has lived in Oakland across the street from Lake Merritt for 27 years, I APPLAUD YOUR ACTIONS AND THOSE OF THE CITY FOR INITIATING A NEW EIR FOR MEASURE DD WHICH WILL INCLUDE A REPORT BY A CERTIFIED ARBORIST!

I, along with a majority of Oakland voters, cast my vote in favor of Measure DD without knowing all the details. I was shocked to learn that mature trees surrounding the Lake Merritt area and the redwoods along the channel were to be cut. Additionally, it alarmed me further to learn that the lawn in front of boathouse was to become a parking lot.

Enclosed is a complete copy of the lawsuit submitted by Attorney Brian Gaffney on behalf of Friends of the Lake . Please include it as part of the official record.

Thank you for your consideration in correcting the OMISSIONS OF THE PREVIOUS EIR.

Sincerely,

Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

From: Nancy Rieser
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Date: Monday, January 22, 2007 4:42:19 PM
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Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

http://us.f528.mail.yahoo.com/dc/launch?.rand=etbcsagu129m5 1/22/2007

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

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Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

Brian Gaffney (CSB 168778)
Matt McFarland (CSB 225537)
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA. 94105
Telephone: (415) 442-0711
Facsimile: (415) 442-0713

For Petitioners/Plaintiffs

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF ALAMEDA

FRIENDS OF THE LAKE, DAVID MIX, GLORIA PIERETTI, and THERESE GEORGE

Petitioners and Plaintiffs,

vs.

CITY OF OAKLAND, and DOES 1 through 20, inclusive,

Respondents and Defendants.

CASE NO.:

PETITION FOR WRIT OF MANDATE AND COMPLAINT FOR INJUNCTIVE AND DECLARATORY RELIEF

By Petition and Complaint, Petitioners and Plaintiffs Friends of the Lake, David Mix and Gloria Pieretti (hereinafter "Petitioners") allege as follows:

INTRODUCTION

1. Petitioners, in bringing this action, challenge the failure of the City of Oakland (collectively "City" or "Respondents") to conduct proper environmental review of significant proposed changes to Lake Merritt, including the removal of over 225 trees from and the alteration of the Lake Merritt channel. The City's actions are illegal as they violate the California Environmental Quality Act, Public Resources Code section 21000 *et seq.* ("CEQA") and the California Code of Regulations, Title 14, section 15000 *et seq.* ("CEQA Guidelines").

2. On or about June 7, 2006, the City granted 3 Tree Removals Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006 (hereinafter collectively "the Approvals") without evaluating the significant adverse impacts of cutting over 225 trees surrounding the shores of Lake Merritt.

3. Subsequently, on or about July 5, 2006, the City certified a seriously flawed Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR") which avoided discussion of the impacts of cutting over 225 trees around Lake Merritt, and inadequately analyzed the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. In reliance on the inadequate EIR, the City approved the Lake Merritt Channel Wetlands and Widening Project ("the channel widening project").

4. In addition, the City's approvals of Tree Removal Permits and a channel widening project which will remove trees that contain nests of birds of prey in the order Falconiformes and Strigiformes violate Fish and Game Code section 3503.5.

5. The City's actions will harm Petitioners, their members and the public, in that environmental values will be degraded and the Lake Merritt project area will be permanently altered—without the environmental review required by law.

PARTIES

6. Petitioner and Plaintiff Friends of the Lake ("Friends") is an unincorporated non-profit association formed after the City granted the Approvals and certified the EIR. Friends is an

alliance of individuals interested in protecting and improving Lake Merritt in Oakland, California, particularly the trees, waters and environs surrounding Lake Merritt. Friends provides a forum for local residents to be involved with Oakland neighborhood developments and to interact with the City government about neighborhood concerns, including proper City planning. Members of Friends—including citizens, taxpayers, property owners and residents—live and work near Lake Merritt, and use and enjoy Lake Merritt for aesthetic, recreational, scientific and social purposes. Friends and its members have a long-standing concern for the project area.

7. Members of Friends submitted comments in writing and verbally to the City of Oakland, *inter alia,* urging the City not to grant the Tree Removal Permit approvals. Members of Friends submitted comments in writing and verbally to the City of Oakland raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Lake Merritt Channel Wetlands and Widening Project. Members of Friends submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

8. Petitioner and Plaintiff David Mix is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. David Mix uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. David Mix is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. David Mix submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. David Mix submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

9. Petitioner and Plaintiff Gloria Pieretti is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Gloria Pieretti uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Gloria Pieretti is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Gloria Pieretti submitted comments, *inter alia*, to the City urging the City not to

grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Gloria Pieretti submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

10. Petitioner and Plaintiff Therese George is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Therese George uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Therese George is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Therese George submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Therese George submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

11. Because Petitioners are interested in proper environmental and land use planning within the City of Oakland, particularly regarding Lake Merritt and the surrounding vicinity, Petitioners have a direct and beneficial interest in the City's compliance with CEQA and the CEQA Guidelines.

12. Petitioners therefore will suffer concrete, actual and imminent injury from Respondents' abuse of discretion in failing to comply with CEQA in granting the Approvals and certifying the EIR.

13. Respondent and Defendant City of Oakland is a city organized under the laws of the State of California. The City is responsible for the formulation and implementation of land use planning in the City of Oakland, including compliance with CEQA and the CEQA Guidelines, grant or denial of Tree Removal Permits, certification of Environmental Impact Reports and determining if projects are exempt from CEQA. The Oakland City Council is the City's elected body that granted the Approvals and certified the EIR.

14. Petitioners are unaware of the true names and capacities of Respondents and Defendants DOES 1 through 20, inclusive, and therefore sues said Respondents and Defendants

under fictitious names. Petitioners will amend its Petition and Complaint to show their true names and capacities when the same have been ascertained. Each of the Respondents and Defendants is the agent and/or employee of each other Respondent and Defendant, and each performed acts on which this action is based within the course and scope of such Respondent and Defendant's agency and/or employment. Petitioners are informed and believe and therefore allege that each Respondent and Defendant is legally responsible in some manner for the events and happenings referred to herein.

STATEMENT OF FACTS

Tree Removal Permits

15. In June 2002, the City released an Initial Study (hereinafter "2002 Initial Study") for all projects associated with proposed Measure DD, then known as the Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure. The 2002 Initial Study purported to review the potentially significant environmental impacts of, *inter alia*, 1) the 12th Street Reconstruction Project, 2) the Lakeside Drive Project, 3) the Lakeshore Avenue/El Embarcadero Project (collectively "the Lake Merritt Projects"), and 4) other Measure DD projects.

16. The 12th Street Reconstruction Project involves reconfiguring the existing 12-lane expressway across the 12th street dam into a six-lane boulevard. The project extends from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue.

17. The Lakeside Drive Project, which is located east of Lakeside Drive between Cameron-Stanford House and Madison street, will convert the Municipal Boathouse from an office facility to commercial uses and an upgrade of the boating facilities.

18. The Lakeshore Avenue/El Embarcadero Project, which is located west of Lakeshore Avenue from East 18th Street to El Embarcadero and includes parkland adjacent to El Embarcadero between the Lakeview Library and the Pergola, will renovate the area in and around Lakeshore Avenue and El Embarcadero.

19. The 2002 Initial Study concluded that "[n]o removal of protected trees as defined by the [City of Oakland] Tree Protection Ordinance is anticipated."

20. In November 2002, the voters of Oakland passed Measure DD, or the Oakland Trust

for Clean Water and Safe Parks, allocating bonds of $198 million to fund a variety of projects in and around Lake Merritt, including the Lake Merritt Projects.

21. In approving Measure DD, the voters of Oakland did not purport to create an exemption from CEQA or to otherwise curtail environmental review or protection.

22. In 2004, the City prepared detailed plans and specifications for the Lake Merritt Projects. During the next 18 months, three detailed tree surveys were completed. The area covered by the Lake Merritt Projects contains a total of 502 trees.

23. The Lake Merritt Projects anticipate the removal of 166 Protected Trees and 60 unprotected trees for a total of 226 protected and unprotected trees to be removed. Specifically, the 12th Street Reconstruction Project contains 347 existing trees, of which 138 Protected trees and 43 unprotected trees will be removed; the Lakeside Drive Project contains 52 existing trees, of which 20 Protected trees will be removed; and the Lakeshore Avenue/El Embarcadero Project contains 103 existing trees, of which 8 Protected trees and 17 unprotected trees will be removed.

24. Many of the trees slated for removal contain nests of birds of prey. Removal of the existing trees would result in a loss of canopy and foraging, nesting, and roosting habitat.

25. On April 11, 2006, the City of Oakland issued an "Explanation of Environmental Review Completed for Tree Permits" for the Lake Merritt Projects, which purported to review the proposed tree permits for the 12th Street Reconstruction Project (Permit # CTO5 - 006), the Lakeshore Avenue/El Embarcadero Project (Permit # CTO5 - 005), and the Lakeside Drive Project (Permit # CTO5 - 004). The City concluded that the three tree permits were exempt from CEQA review.

26. On April 13, 2006, the City approved the three Tree Removal Permits. These Approvals will result in removal of over 165 protected trees and over 50 unprotected trees around Lake Merritt.

27. On April 21, 2006, the approvals of the tree removal permits were appealed by concerned citizens, including Petitioners. The appeal raised numerous environmental and procedural concerns regarding the City's Approvals.

28. On or around June 7, 2006, the City issued a Notice of Determination, which denied

the appeal of the tree permits. The City determined that "The Project does not require further CEQA review under section 15162 of the CEQA Guidelines because no information was presented to indicate that substantial changes to the project, substantial changes in the circumstances of the project or any new information that was not known, or could have been known, at the time of the prior certified CEQA review of the Measure DD approved projects was presented."

Lake Merritt Wetlands and Widening Project

29. The Lake Merritt Channel Wetlands and Widening Project (hereinafter "the channel widening project" or "the project"), located along the Lake Merritt Channel between Lake Merritt and I-880, is part of the larger 12th Street Reconstruction Project. Specifically, the channel widening project is a proposal by the City to widen the Lake Merritt Channel, create new tidal marsh habitat and stabilize slopes along the Lake Merritt Channel and 10th Street.

30. There are a number of tall trees on the Project site, including 35 Protected Trees, as defined by the City of Oakland Tree Protection Ordinance.

31. No Environmental Impact Report has been issued for the 12th Street Reconstruction project.

32. A Notice of Preparation of Draft Tiered Environmental Impact Report for the channel widening project was prepared on October 20, 2005, and this Notice stated that the Project's Draft EIR "will tier off the previous environmental analysis" despite the fact that no EIR was prepared for the 12th Street Reconstruction Project.

33. A Draft EIR was released for the Lake Merritt Channel Wetlands and Widening Project on or about April 14, 2006. As part of the channel widening project, either 31 or 35 Protected trees will be removed. The Draft EIR states that the 35 trees to be removed by the project are a subset of the 181 trees listed for removal within the 12th Street Reconstruction Project.

34. On May 17, 2006, the City held public hearings on the project. Petitioners attended those meetings and objected to the project as proposed and the adequacy of the EIR. On or before June 2, 2006 Petitioners, members of the public, experts, and other concerned persons timely submitted written comments to Respondents critiquing the Draft EIR and the project as proposed.

35. A Response to Comments constituting the Final EIR was released in June 2006.

36. On or about July 5, 2006, the City certified the Lake Merritt Channel Wetlands and Widening Project EIR.

37. On or about July 11, 2006 the City filed a Notice of Determination that the channel widening project will not have a significant effect on the environment.

PROCEDURAL ALLEGATIONS

38. This Court has jurisdiction over this action pursuant to California Code of Civil Procedure section 1094.5 and Public Resources Code section 21168.

39. Petitioners and its members have performed any and all conditions precedent to filing the instant action and have exhausted any and all available administrative remedies to the extent required by law by, *inter alia,* submitting written and oral comments on the Approval and the EIR at each stage of the administrative process. Petitioners have submitted written and oral comments to Respondents regarding compliance with CEQA and the CEQA Guidelines of the Approval and the EIR. Petitioners have standing to bring this action.

40. Petitioners and its members timely raised each and every significant substantive and procedural issue known to them in compliance with Public Resources Code section 21177 during the review process for the Approvals and the EIR. Petitioners and its members have requested that Respondents not grant the Tree Permit Approvals. Petitioners and its members have requested Respondents not certify the Lake Merritt Channel Wetlands and Widening Project EIR. Any further exhaustion would be futile.

41. Petitioners have complied with the requirements of Public Resources Code section 21167.5 by mailing a written notice of the commencement of this action to Respondents prior to filing this Petition and Complaint. A copy of the prior written notice provided to Respondents, with proof of service thereof, is attached hereto as Exhibit "A".

42. Petitioners have complied with the requirements of Public Resources Code section 21167.7 and Code of Civil Procedure section 388 by mailing a copy of the Petition and Complaint to the state Attorney General.

43. Petitioners have complied with Public Resources Code section 21167.6 by filing a Request For Preparation of the Record of Proceedings relating to this action at the time this Petition

and Complaint was filed. The request notified Respondents that Petitioners would elect to prepare the record or that the parties would agree to an alternative method of preparation.

44. Petitioners have no plain, speedy or adequate remedy in the ordinary course of law unless this Court grants the requested writ of mandate to require Respondents to comply with their duties and set aside the Tree Permit Approvals and the certification of the EIR. In the absence of such remedies, Respondents' actions continue to violate CEQA and Code of Civil Procedure 1094.5.

45. If Respondents are not enjoined from implementing the Approvals, certifying the EIR and from undertaking acts in furtherance thereof, Petitioners will suffer irreparable harm for which there is no adequate remedy at law in that Lake Merritt and the Lake Merritt area would be irrevocably altered and significant adverse impacts on the environment would occur. Petitioners and the general public have also been harmed by Respondents' grant of the Approvals without proper environmental review, by certification of an EIR that fails to accurately and fully inform interested persons and decision-makers of environmental impacts, by Respondents' failure to make required findings, and by certification of an EIR not supported by credible substantial evidence.

46. In pursuing this action, which involves enforcement of important rights affecting the public interest, Petitioners will confer a substantial benefit on the general public including residents of the City of Oakland, the San Francisco Bay Area and the State of California, and therefore will be entitled to attorneys' fees and costs pursuant to, *inter alia*, Code of Civil Procedure section 1021.5.

47. Petitioners brings this action pursuant to Public Resources Code section 21168 and Code of Civil Procedure section 1094.5, which require that an agency's approval of a project be set aside if the agency has prejudicially abused its discretion. Prejudicial abuse of discretion occurs where Respondents have failed to proceed in the manner required by law, where decisions are not supported by findings, or where findings are not supported by the evidence.

48. This action is timely filed.

STATEMENT OF LAW

49. CEQA is an integral part of every public agency's decisionmaking process. (Pub. Res. Code §21006.)

50. CEQA was enacted to protect the environment by the establishment of administrative procedures drafted to ensure that the long-term protection of the environment shall be the guiding criterion in public decisions.

51. CEQA requires public agencies to document and consider the environmental implications of their actions before formal decisions are made. (Pub. Res. Code §§ 21000, 21001.)

52. Projects carried out by public agencies are subject to the same level or review and consideration under CEQA as that of private projects approved by public agencies. (Pub. Res. Code §21001.1.)

53. All public agencies must prepare, or cause to be prepared, and certify the completion of an EIR on any project which they propose to carry out that may have a significant effect on the environment. (Pub. Res. Code §§21100, 21151.)

54. The purpose of an EIR is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided. (Pub. Res. Code §21002.1(a).) The EIR serves not only to protect the environment but also to demonstrate to an apprehensive pubic that it is being protected. (14 CCR §15003(b).)

55. The lead agency must consider the whole of an action, not simply its constituent parts. (14 CCR §15003(h).) The lead agency is responsible for considering the effects, both individual and collective of all activities involved in a project. (Pub. Res. Code §21002.1.)

56. A "project" under CEQA is the whole of an action, including activities directly undertaken by any public agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. (14 CCR §15378.) A project is an activity by a public agency, including but not limited to public works construction and related activities, as well as clearing or grading of land. (Id.)

57. A significant effect is a "potentially substantial, adverse change." (Pub. Res. Code §21068.) This means that an activity has a significant effect if it "has the potential to degrade the quality of the environment." (Pub. Res. Code §21083.)

FIRST CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY GRANTING THREE TREE REMOVAL PERMIT APPROVALS WITHOUT CONDUCTING PROPER ENVIRONMENTAL REVIEW

58. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

59. Respondents' grant of an exemption from CEQA and issuance of a Notice of Exemption for the Tree Permit Approvals are contradicted by substantial evidence in the record, did not follow the procedure required by CEQA, and were not supported by adequate Findings as required by CEQA and CCP 1094.5.

60. There is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

61. The City's reliance on the 2002 Initial Study for grant of the Approvals is improper as the 2002 Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

62. The City's reliance on CEQA Guideline 15162 to exempt environmental review is improper.

63. Respondents' actions in failing to conduct full environmental review in association with granting the three Tree Removal Permits constitutes a prejudicial abuses of discretion in that there is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

SECOND CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY CERTIFYING THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR

64. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

65. Respondents' certification of the Lake Merritt Channel Wetlands and Widening Project EIR constitutes prejudicial abuses of discretion in that Respondents failed to proceed in the

manner required by law as set forth below.

Count One: The Lake Merritt Channel Wetlands and Widening Project EIR Fails to Adequately Describe the Project.

66. CEQA Guideline section 15124 requires a description of the project that contains information needed for evaluation and review of the environmental impacts resulting from the channel widening project.

67. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including removal of all trees authorized by the Approvals.

68. The Lake Merritt Channel Wetlands and Widening EIR project description entirely omits mention of any tree removal as part of the channel widening project's technical and environmental characteristics.

69. The Lake Merritt Channel Wetlands and Widening EIR fails to include an accurate, stable and finite project description as it alternately describes the project as resulting in removal of 35 Protected Trees and 31 Protected Trees.

70. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including channel deepening.

71. CEQA requires that a proper project description be included in the EIR. Omission of this project description was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this stable, finite and accurate project description.

Count Two: Inadequate Description of the Environmental Setting

72. The EIR fails to adequately describe the environmental setting, as it exists before the commencement of the project, to establish a baseline for analyzing potentially significant impacts. (CEQA Guidelines §15125(a); San Joaquin Raptor v. County of Stanislaus (1994) 27 Cal. App. 4th 713, 722-723.)

73. The EIR fails to describe all trees surrounding Lake Merritt which constitute the environmental setting.

74. The EIR fails to describe all protected trees surrounding Lake Merritt which

constitute the environmental setting.

75. The EIR fails to describe all birds which utilize Lake Merritt as part of EIR's environmental setting.

76. The EIR fails to describe any birds-of-prey in the order Falconiformes which utilize Lake Merritt as part of the EIR's environmental setting.

77. The EIR fails to describe any birds-of-prey in the order Strigiformes which utilize Lake Merritt as part of the EIR's environmental setting.

78. The EIR fails to describe which passerine birds protected by the Migratory Bird Treaty Act utilize Lake Merritt as part of the EIR's environmental setting.

79. CEQA requires that a proper description environmental setting be included in the EIR. Omission of this environmental setting was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this description of environmental setting.

Count Three: Inadequate Analysis of the Channel Widening Project's Significant Environmental Impacts

80. An EIR must evaluate all significant environmental effects of a proposed project. (Pub. Res. Code §§ 21100(b)(1), 21061; CEQA Guidelines §§ 15126(a), 15143.) The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." (CEQA Guideline § 15143.) EIRs should be "prepared with a sufficient degree of analysis to provide decision-makers with information which intelligently takes account of environmental consequences." (CEQA Guidelines § 15151.) The analysis must include both direct and indirect impacts, as they occur in both the short term and the long term. Identification of a projects' significant environmental impacts is a central purpose of an EIR and is necessary to implement CEQA's policy. (Pub. Res. Code §§ 21002.1(a), 21003.1(b).) Under CEQA, the EIR cannot defer analysis of impacts until a later date. This EIR's analysis of significant impacts fails to meet these standards.

81. The EIR improperly fails to include analysis of the channel widening project's impacts on nests of birds of prey in the order Falconiformes or Strigiformes.

82. The EIR improperly fails to include analysis of the Approvals' impacts on birds of prey in the order Falconiformes or Strigiformes and their nests and eggs.

83. The EIR fails to accurately assess the impacts of channel deepening.

84. The EIR fails to adequately analyze the impacts of loss of canopy and foraging, nesting and roosting habitat for migratory birds.

85. CEQA requires that such proper analysis of significant environmental impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this analysis.

Count Four: Inadequate Analysis of Cumulative Impacts

86. An EIR must also analyze and discuss significant cumulative impacts of the project. (CEQA Guidelines § 15130; Pub. Res. Code § 21083(b).) Cumulative impacts are "two or more individual effects which, when viewed together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines §15355.) The individual effects may be changes resulting from a single project or a number of separate projects. (CEQA Guidelines § 15355(a).) The cumulative impacts analysis is vital in preventing impacts which are individually minor but cumulatively considerable from overwhelming the environment.

87. An EIR must include either (A) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) a summary of projections contained in an adopted general plan or related planning document, or in a prior certified environmental document which described or evaluated regional or areawide conditions contributing to the cumulative impact. (CEQA Guidelines § 15130(b)(1).)

88. The EIR's analysis of cumulative impacts violates CEQA. The fundamental flaws in its analysis include but are not limited to the following:

89. The EIR fails to analyze the cumulative impact of this project in combination with all closely related past, present and reasonably foreseeable future projects in determining impacts to biological resources.

90. The EIR fails to provide any analysis of the cumulative impacts to geology and soils.

91. The EIR fails to provide any analysis of the cumulative impacts to hydrology and water quality.

92. The EIR contains neither the cumulative project list nor the projection summary required by CEQA.

93. The EIR's cumulative impact approach —determining first "the cumulative impact area" and then determining whether the project impacts, examined alone, is cumulatively considerable—contradicts CEQA and CEQA Guidelines 15065, 15130 and 15355.

94. The EIR applies an incorrect standard for determining cumulative biological resources impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit" to biological resources.

95 The EIR fails to consider the 226 trees that will be removed by the Approvals as part of its consideration of the cumulative biological resources impacts.

96. The EIR applies an incorrect standard for determining cumulative hydrology and water quality impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit to the environment."

97. The EIR fails to provide a reasonable explanation related to the geographic scope of the area affected by each cumulative effects analysis, as required by CEQA.

98. The EIR's cumulative impact analysis avoids the CEQA requirement that even where an incremental effect that is determined not to be "cumulatively considerable," the EIR must still briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

99. CEQA requires that such analysis of cumulative impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Five: Inadequate Analysis of Alternatives

100. CEQA Guideline section 15126.6 requires an EIR to describe and consider "a reasonable range of alternatives to the proposed project." Section 15126.6 further states that the "range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to

set forth only those alternatives necessary to permit a reasoned choice."

101. The EIR fails to analyze a reasonable range of project alternatives or to adopt feasible alternatives to substantially lessen significant adverse effects on the environment as the EIR only considers one alternative: the No-Project/No-Build Alternative.

102. CEQA requires that such analysis of alternatives be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Six: Respondents Improperly Purported to Tier the Draft EIR to "Previous Environmental Analysis" and the 2002 Initial Study

103. CEQA guideline section 15152(a) allows tiering, which includes "using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project." When tiering is used, the later EIRs or negative declarations shall refer to the prior EIR and state where a copy of the prior EIR may be examined. CEQA Guideline § 15152(g). The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier EIR. *Ibid.*

104. The Draft EIR purports to tiered off of "previous environmental analyses," including the 2002 Initial Study for all projects proposed under Measure DD, which determined that "no removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

105. The EIR violates CEQA because it improperly tiered to the 2002 Initial Study, which contains no discussion of the tree removal.

106. The EIR violates CEQA because CEQA requires tiering off of other approved EIRs, not tiering off of vague "previous environmental analysis" or Initial Studies.

107. Tiering as purported here was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying an EIR which improperly tiered.

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THIRD CAUSE OF ACTION

CREDIBLE SUBSTANTIAL EVIDENCE DOES NOT SUPPORT THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR CONCLUSIONS

108. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

109. Respondents' actions in certifying the EIR constitutes a prejudicial abuses of discretion in that there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts—given that the widening project will result in the removal of 35 protected trees and given that the widening project, along with other past, present and reasonably foreseeable future projects, will result in the removal of over 225 trees in and around Lake Merritt.

FOURTH CAUSE OF ACTION

IMPROPER SEGMENTATION OF THE PROJECT

110. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

111. The EIR fails to present or evaluate an accurate project description, and fails to describe the whole of the project, including all activities within the scope of the project. *See e.g. County of Inyo v. City of Los Angeles* (1977) 71 Cal. App. 3d 185, 193; CEQA Guidelines 15124 and "Discussion" following and 15378. Instead, the project description is "piecemealed," and thus avoids analysis of the entire project. (*See e.g. Citizens for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal. App. 3d 151).

112. The 2002 Initial Study, off of which the EIR is tiered, examines all Measure DD projects, including the Lake Merritt Projects (*i.e.*, the 12th Street Reconstruction Project, the Lakeside Drive Project and the Lakeshore Avenue/El Embarcadero Project); projects covered by the Estuary Policy Plan (*e.g.*, the Oak to Ninth project and the Jack London Square Redevelopment project); projects that would improve a number of creeks in Oakland (*e.g.*, Sausal Creek, Lion Creek of Palo Seco Creek, Cinderella Creek and Shepard Creek); and projects located within the Coliseum Area Redevelopment Plan.

113. The channel widening project is a small part of the larger 12th Street Reconstruction Project, which, in turn, is a small part of the larger Lake Merritt Projects, which, in turn, are a small part of the larger Measure DD-funded projects.

114. By describing the project as including only the Lake Merritt Wetlands and Channel Widening piece of the project and by analyzing only the environmental impacts resulting from the Lake Merritt Wetlands and Channel Widening segment of the project, the EIR engages in improper segmentation and fails to include all activities within the scope of the project.

FIFTH CAUSE OF ACTION

RESPONDENTS FAILED TO MAKE ADEQUATE FINDINGS

115. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

116. CEQA requires that no agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur: (a) The public agency makes one or more of the following findings with respect to each significant effect: (1) changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment; (2) those changes or alterations are within the responsibility and jurisdiction of another agency and have been, or can and should be, adopted by that other agency; (3) specific economic, legal, social, technological, or other considerations, make infeasible the mitigations or alternatives identified in the EIR; and (b) with respect to significant effects which were subject to a finding under paragraph (a) (3), the agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

117. Findings providing an analytical route between the evidence and an agency's ultimate conclusions are also required pursuant to Code of Civil Procedure section 1094.5.

118. Respondents failed to make adequate findings in regards to each significant effect identified by the Lake Merritt Channel Wetlands and Widening Project EIR. The findings are inadequate as they do not explain how proposed mitigations will mitigate the project, do not explain

why the facts in the record support the proposed mitigation, do not provide a logical explanation establishing the relationship between the findings and the evidence, because a separate finding is not made for each significant impact, and because the findings are not supported by substantial evidence.

119. Respondents failed to make adequate findings for grant of the three Tree Removal Permits explaining why the facts in the record support the City's decision that the Tree Removal Permits are exempt from CEQA review and because the findings are not supported by substantial evidence.

120. Respondents' failure to make adequate findings constitutes a prejudicial abuse of discretion in violation of Code of Civil Procedure section 1094.5, Public Resource Code section 21081 and CEQA Guidelines 15091.

SIXTH CAUSE OF ACTION

RESPONDENTS VIOLATED FISH AND GAME CODE SECTION 3503.5 BY AUTHORIZING DESTRUCTION OF NESTS AND TAKE OF BIRDS IN THE ORDER FALCONIFORMES AND STRIGIFORMES

121. Petitioners incorporate by reference the allegations set forth in the preceding paragraphs.

122. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.

123. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons.

124. Birds of prey in the order Strigiformes include owls.

125. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will remove 31 trees which provide potential nesting habitat for species of raptors and birds of prey, including the red-tailed hawks and red-shouldered hawks.

126. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will result in lose of nesting habitat.

127. The Lake Merritt Channel Wetlands and Widening Project EIR proposes a mitigation which includes destroying nests of birds in the orders Falconiformes or Strigiformes (birds-of-prey)

once young birds have fledged.

128. The Approvals will result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds.

129. In granting the Approvals and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

PRAYER FOR RELIEF

WHEREFORE, Petitioners and Plaintiffs Pray for Relief as Follows:

1. For a peremptory writ of mandate directing Respondents to set aside and vacate 1) the Tree Removal Permit approvals Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006, and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

2. For a peremptory writ of mandate directing Respondents to fully comply with CEQA prior to approving any Tree Removal Permit in and around Lake Merritt, including but not limited to Tree Removal Permits, Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006;

3. For a peremptory writ of mandate directing Respondents to make comply with CEQA in conjunction with the Lake Merritt Channel Wetlands and Widening Project by preparing an adequate EIR, recirculating such adequate EIR for public comment, and take any other action as required pursuant to section 21168.9 of the Public Resources Code prior to granting any future approvals for the widening project.

4. For a peremptory writ of mandate directing Respondents to make adequate findings in support of 1) any approval of Tree Removal Permits in and around Lake Merritt and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

5. For a preliminary and a permanent injunction restraining all Respondents and their agents, servants and employees, and all others acting in concert with them or in their behalf, from undertaking any physical construction, demolition or development, issuing any construction, demolition or development approvals or permits, including without limitation granting or approving any funding, or taking any other action in any way to implement the project, pending full compliance with CEQA, Code of Civil Procedure section 1094.5, and all other requirements of law.

6. For costs of the suit incurred herein.

7. For attorneys' fees pursuant to section 1021.5 of the Code of Civil Procedure; and

8. For such other and further relief as the Court deems just and proper.

DATED: August 7, 2006

LAW OFFICES OF BRIAN GAFFNEY

By: _____
Brian Gaffney
Matt McFarland

07

Dear Elois,

Please consider This material For Case #ER06001 7. DD Lake Merritt Draft Environmental Impact Report.

Thank you and Best wishes for The Process.

Sincerely,

John Wilson

510-452-5788

Lake Merritt History

In 1867, Dr. Samuel Merritt donated 155 acres of dammed tidal water from the headwaters of Indian Slough, it became known as "Merritt's Lake" and later Lake Merritt. In 1925, Lake Merritt's "Necklace of Lights" is lit for the first time during the Dons of Peralta Water Festival. There are 126 lampposts, each given by an organization or an individual. The lampposts and 3,400 pearly bulbs shine until 1941 when World War II blackout conditions are enforced.

Sometimes called the Jewel of Oakland, Oakland is the city in the United States with a salt water lake in the downtown metropolitan area. Originally part of the San Francisco bay, in 1869, Oakland Mayor Dr. Samual Merritt donated money to build a dam at the 12th Street bridge, across the "neck" of the inlet, thus creating the present day lake. It was called "Merritt's Lake", and gradually over time became Lake Merritt.

In 1963, the Wildlife Refuge at Lake Merritt was registered as a National Historic Landmark. The nation's oldest wildlife refuge, expanding 140 acres, with a shoreline of 3.4 miles around the lake. The brackish water, which consists of fresh water and salt water, of the lake is eight to ten feet deep, supporting and residing as a home to shrimp, fish, birds (migratory and residental), clams, and crabs.

Related links:
- Oakland Heritage

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Wildlife Sanctuary

Lake Merritt originally resided as a wide, tidal estuary (salt water marsh) that was known as the Laguna Peralta. The Pacific flyway has remained a sanctuary and stop-over for thousands of migratory birds.

Dr. Merritt, the Mayor of Oakland, declared the Lake a National Wildlife Refuge in 1869, the first in North America. A dam was proposed to regulate the tidal water flow, to increase the water level, with a retaining wall that is 3.18 miles in perimeter.

In 1915 organized feedings of the wildlife (ducks) began. In 1925 the first bird island was constructed and four additional islands were erected in 1956. These are the largest of the artificial islands that house hundreds of egrets, herons, canada goose, and many other species of birds. The islands are equiped with fresh water ponds. To ensure that marine sports and boating activities based at Lake Merritt aren't distruptive to the birds, a boom cordons off the five islands from this section.

California Wildlife Act

Statues of California
Eighteenth Session Chapter CCXXIV
An Act to prevent the destruction of fish and game in, upon and around the waters of Lake Merritt or Peralta, in the County of Alameda.

Approved March 18, 1870

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1 From and after the passage of this Act, it shall be unlawful for any person to take, catch, kill, capture, or in any manner destroy, any fish in the waters of Lake Merritt or Peralta, in the County of Alameda, except by the use of a hook and line; but it shall be unlawful to use any set lines, night lines or crawls in said lake.

Section 2 And be it further enacted, that from and after the passage of this Act, it shall be unlawful for any person to take, kill or destroy, in any manner whatever, the grouse, any species of wild duck, crane, heron, swan, pelican, snip, or any wild animal or game, of any kind or species whatever, upon, in or around Lake Merritt or Peralta, in the County of Alameda, and within one hundred rods from high water mark upon the land around said lake.

Section 3 Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace of said county, or Police Judge of any city within said county, shall be punished by a fine of not exceeding five hundred dollars, and in default of payment of such fine, shall be imprisoned in the county jail of said county, or within a city prison within said county, not more than six months nor less than one month.

Section 4 The fines collected under this Act shall be paid into the county treasury, in all cases prosecuted before a Justice of the Peace, and into the city treasury in all cases of prosecution before a Police Judge of any city within the county.

Section 5 This Act shall take effect and be in full force on and after its passage.

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Thornton, Elois A

From: Judith S Offer [joffer@juno.com]
Sent: Monday, January 22, 2007 5:39 PM
To: eathornton@oaklandnet.com
Cc: pkernighan@oaklandnet.com; dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@hyla.net; mlighty@calnurses.org; mam@ionix.net; amudge@coxcastle.com; gofindnancy@yahoo.com; rbishop747@alo.com; mepf@bacbell.net
Subject: Road Change Between Lakeview Library and Lake

Hello Ms. Elois Thornton:

I understand that you are the planner assigned to work on the change of the two one-way roads which connect Grand Avenue to Lakeshore, between the Lakeview Library and the Lake, to a single two-way road. Although the Commission has (briefly) discussed this change, I would like to suggest that you consider having the two-way road located where the traffic island between the two roads is now. Here are my reasons:

While it is wonderful to add a few extra feet to the Lakeshore, it is also important to consider the noise and exhaust pollution which would impinge on library use. As a playwright, poet, activist, and neighbor, I have often used the regular library services at Lakeview and have attended events (sometimes as the presenter) at the Library. Currently, if the windows are open there are times you cannot be heard above the noise. Also, I wonder if anyone has measured the car exhaust levels for the EIR? Putting the road two feet closer seems a little ridiculous!

Currently, the island is wasted space. It is too noisy and too exposed for picnics, resting, or any other use besides walking over it.

The Lakeview Branch is a delightful small building, with a wonderful space for events. The staff is terrific, full of help and ideas. It is an extremely popular branch, and is especially important for the large number of seniors who live in nearby apartments.

I urge you to consider this alternative.

Judith Offer

Thornton, Elois A

From: Nancy Rieser [gofindnancy@yahoo.com]
Sent: Monday, January 22, 2007 4:42 PM
To: eathornton@oaklandnet.com; Gloria Pieretti
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Subject: Fw: PDF of lawsuit

Dear Ms. Thorton,

I am submitting this on behalf of Gloria Pierett, whose computer is not cooperating with her today! She was able to send this letter to me before all heck froze.

She is a collegue of mine in the Merritt Lakesiders and the No Clear Cut Group and is at the core of the Friends of the Lake Lawsuit which inspired the City to start the EIR process from scratch. Her letter is below and the lawsuit is appended as an attachment. She would like the entire lawsuit (21 pages) to be part of the record.

I will be hand delivering a hard copy of the letter and the attachment to the Planning Department momentarily.

Nancy Rieser

Nancy Rieser

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

Dear Ms. Thornton

As a concerned citizen who has lived in Oakland across the street from Lake Merritt for 27 years, I APPLAUD YOUR ACTIONS AND THOSE OF THE CITY FOR INITIATING A NEW EIR FOR MEASURE DD WHICH WILL INCLUDE A REPORT BY A CERTIFIED ARBORIST!

I, along with a majority of Oakland voters, cast my vote in favor of Measure DD without knowing all the details. I was shocked to learn that mature trees surrounding the Lake Merritt area and the redwoods along the channel were to be cut. Additionally, it alarmed me further to learn that the lawn in front of boathouse was to become a parking lot.

Enclosed is a complete copy of the lawsuit submitted by Attorney Brian Gaffney on behalf of Friends of the Lake. Please include it as part of the official record.

Thank you for your consideration in correcting the OMISSIONS OF THE PREVIOUS EIR.

1/23/2007

Sincerely,

Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

1/23/2007

Brian Gaffney (CSB 168778)
Matt McFarland (CSB 225537)
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA. 94105
Telephone: (415) 442-0711
Facsimile: (415) 442-0713

For Petitioners/Plaintiffs

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF ALAMEDA

FRIENDS OF THE LAKE, DAVID MIX, GLORIA PIERETTI, and THERESE GEORGE

Petitioners and Plaintiffs,

vs.

CITY OF OAKLAND, and DOES 1 through 20, inclusive,

Respondents and Defendants.

CASE NO.:

PETITION FOR WRIT OF MANDATE AND COMPLAINT FOR INJUNCTIVE AND DECLARATORY RELIEF

By Petition and Complaint, Petitioners and Plaintiffs Friends of the Lake, David Mix and Gloria Pieretti (hereinafter "Petitioners") allege as follows:

INTRODUCTION

1. Petitioners, in bringing this action, challenge the failure of the City of Oakland (collectively "City" or "Respondents") to conduct proper environmental review of significant proposed changes to Lake Merritt, including the removal of over 225 trees from and the alteration of the Lake Merritt channel. The City's actions are illegal as they violate the California Environmental Quality Act, Public Resources Code section 21000 *et seq.* ("CEQA") and the California Code of Regulations, Title 14, section 15000 *et seq.* ("CEQA Guidelines").

2. On or about June 7, 2006, the City granted 3 Tree Removals Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006 (hereinafter collectively "the Approvals") without evaluating the significant adverse impacts of cutting over 225 trees surrounding the shores of Lake Merritt.

3. Subsequently, on or about July 5, 2006, the City certified a seriously flawed Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR") which avoided discussion of the impacts of cutting over 225 trees around Lake Merritt, and inadequately analyzed the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. In reliance on the inadequate EIR, the City approved the Lake Merritt Channel Wetlands and Widening Project ("the channel widening project").

4. In addition, the City's approvals of Tree Removal Permits and a channel widening project which will remove trees that contain nests of birds of prey in the order Falconiformes and Strigiformes violate Fish and Game Code section 3503.5.

5. The City's actions will harm Petitioners, their members and the public, in that environmental values will be degraded and the Lake Merritt project area will be permanently altered—without the environmental review required by law.

PARTIES

6. Petitioner and Plaintiff Friends of the Lake ("Friends") is an unincorporated non-profit association formed after the City granted the Approvals and certified the EIR. Friends is an

alliance of individuals interested in protecting and improving Lake Merritt in Oakland, California, particularly the trees, waters and environs surrounding Lake Merritt. Friends provides a forum for local residents to be involved with Oakland neighborhood developments and to interact with the City government about neighborhood concerns, including proper City planning. Members of Friends—including citizens, taxpayers, property owners and residents—live and work near Lake Merritt, and use and enjoy Lake Merritt for aesthetic, recreational, scientific and social purposes. Friends and its members have a long-standing concern for the project area.

7. Members of Friends submitted comments in writing and verbally to the City of Oakland, *inter alia,* urging the City not to grant the Tree Removal Permit approvals. Members of Friends submitted comments in writing and verbally to the City of Oakland raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Lake Merritt Channel Wetlands and Widening Project. Members of Friends submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

8. Petitioner and Plaintiff David Mix is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. David Mix uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. David Mix is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. David Mix submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. David Mix submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

9. Petitioner and Plaintiff Gloria Pieretti is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Gloria Pieretti uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Gloria Pieretti is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Gloria Pieretti submitted comments, *inter alia*, to the City urging the City not to

grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Gloria Pieretti submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

10. Petitioner and Plaintiff Therese George is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Therese George uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Therese George is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Therese George submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Therese George submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

11. Because Petitioners are interested in proper environmental and land use planning within the City of Oakland, particularly regarding Lake Merritt and the surrounding vicinity, Petitioners have a direct and beneficial interest in the City's compliance with CEQA and the CEQA Guidelines.

12. Petitioners therefore will suffer concrete, actual and imminent injury from Respondents' abuse of discretion in failing to comply with CEQA in granting the Approvals and certifying the EIR.

13. Respondent and Defendant City of Oakland is a city organized under the laws of the State of California. The City is responsible for the formulation and implementation of land use planning in the City of Oakland, including compliance with CEQA and the CEQA Guidelines, grant or denial of Tree Removal Permits, certification of Environmental Impact Reports and determining if projects are exempt from CEQA. The Oakland City Council is the City's elected body that granted the Approvals and certified the EIR.

14. Petitioners are unaware of the true names and capacities of Respondents and Defendants DOES 1 through 20, inclusive, and therefore sues said Respondents and Defendants

under fictitious names. Petitioners will amend its Petition and Complaint to show their true names and capacities when the same have been ascertained. Each of the Respondents and Defendants is the agent and/or employee of each other Respondent and Defendant, and each performed acts on which this action is based within the course and scope of such Respondent and Defendant's agency and/or employment. Petitioners are informed and believe and therefore allege that each Respondent and Defendant is legally responsible in some manner for the events and happenings referred to herein.

STATEMENT OF FACTS

Tree Removal Permits

15. In June 2002, the City released an Initial Study (hereinafter "2002 Initial Study") for all projects associated with proposed Measure DD, then known as the Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure. The 2002 Initial Study purported to review the potentially significant environmental impacts of, *inter alia*, 1) the 12th Street Reconstruction Project, 2) the Lakeside Drive Project, 3) the Lakeshore Avenue/El Embarcadero Project (collectively "the Lake Merritt Projects"), and 4) other Measure DD projects.

16. The 12th Street Reconstruction Project involves reconfiguring the existing 12-lane expressway across the 12th street dam into a six-lane boulevard. The project extends from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue.

17. The Lakeside Drive Project, which is located east of Lakeside Drive between Cameron-Stanford House and Madison street, will convert the Municipal Boathouse from an office facility to commercial uses and an upgrade of the boating facilities.

18. The Lakeshore Avenue/El Embarcadero Project, which is located west of Lakeshore Avenue from East 18th Street to El Embarcadero and includes parkland adjacent to El Embarcadero between the Lakeview Library and the Pergola, will renovate the area in and around Lakeshore Avenue and El Embarcadero.

19. The 2002 Initial Study concluded that "[n]o removal of protected trees as defined by the [City of Oakland] Tree Protection Ordinance is anticipated."

20. In November 2002, the voters of Oakland passed Measure DD, or the Oakland Trust

for Clean Water and Safe Parks, allocating bonds of $198 million to fund a variety of projects in and around Lake Merritt, including the Lake Merritt Projects.

21. In approving Measure DD, the voters of Oakland did not purport to create an exemption from CEQA or to otherwise curtail environmental review or protection.

22. In 2004, the City prepared detailed plans and specifications for the Lake Merritt Projects. During the next 18 months, three detailed tree surveys were completed. The area covered by the Lake Merritt Projects contains a total of 502 trees.

23. The Lake Merritt Projects anticipate the removal of 166 Protected Trees and 60 unprotected trees for a total of 226 protected and unprotected trees to be removed. Specifically, the 12th Street Reconstruction Project contains 347 existing trees, of which 138 Protected trees and 43 unprotected trees will be removed; the Lakeside Drive Project contains 52 existing trees, of which 20 Protected trees will be removed; and the Lakeshore Avenue/El Embarcadero Project contains 103 existing trees, of which 8 Protected trees and 17 unprotected trees will be removed.

24. Many of the trees slated for removal contain nests of birds of prey. Removal of the existing trees would result in a loss of canopy and foraging, nesting, and roosting habitat.

25. On April 11, 2006, the City of Oakland issued an "Explanation of Environmental Review Completed for Tree Permits" for the Lake Merritt Projects, which purported to review the proposed tree permits for the 12th Street Reconstruction Project (Permit # CTO5 - 006), the Lakeshore Avenue/El Embarcadero Project (Permit # CTO5 - 005), and the Lakeside Drive Project (Permit # CTO5 - 004). The City concluded that the three tree permits were exempt from CEQA review.

26. On April 13, 2006, the City approved the three Tree Removal Permits. These Approvals will result in removal of over 165 protected trees and over 50 unprotected trees around Lake Merritt.

27. On April 21, 2006, the approvals of the tree removal permits were appealed by concerned citizens, including Petitioners. The appeal raised numerous environmental and procedural concerns regarding the City's Approvals.

28. On or around June 7, 2006, the City issued a Notice of Determination, which denied

the appeal of the tree permits. The City determined that "The Project does not require further CEQA review under section 15162 of the CEQA Guidelines because no information was presented to indicate that substantial changes to the project, substantial changes in the circumstances of the project or any new information that was not known, or could have been known, at the time of the prior certified CEQA review of the Measure DD approved projects was presented."

Lake Merritt Wetlands and Widening Project

29. The Lake Merritt Channel Wetlands and Widening Project (hereinafter "the channel widening project" or "the project"), located along the Lake Merritt Channel between Lake Merritt and I-880, is part of the larger 12th Street Reconstruction Project. Specifically, the channel widening project is a proposal by the City to widen the Lake Merritt Channel, create new tidal marsh habitat and stabilize slopes along the Lake Merritt Channel and 10th Street.

30. There are a number of tall trees on the Project site, including 35 Protected Trees, as defined by the City of Oakland Tree Protection Ordinance.

31. No Environmental Impact Report has been issued for the 12th Street Reconstruction project.

32. A Notice of Preparation of Draft Tiered Environmental Impact Report for the channel widening project was prepared on October 20, 2005, and this Notice stated that the Project's Draft EIR "will tier off the previous environmental analysis" despite the fact that no EIR was prepared for the 12th Street Reconstruction Project.

33. A Draft EIR was released for the Lake Merritt Channel Wetlands and Widening Project on or about April 14, 2006. As part of the channel widening project, either 31 or 35 Protected trees will be removed. The Draft EIR states that the 35 trees to be removed by the project are a subset of the 181 trees listed for removal within the 12th Street Reconstruction Project.

34. On May 17, 2006, the City held public hearings on the project. Petitioners attended those meetings and objected to the project as proposed and the adequacy of the EIR. On or before June 2, 2006 Petitioners, members of the public, experts, and other concerned persons timely submitted written comments to Respondents critiquing the Draft EIR and the project as proposed.

35. A Response to Comments constituting the Final EIR was released in June 2006.

36. On or about July 5, 2006, the City certified the Lake Merritt Channel Wetlands and Widening Project EIR.

37. On or about July 11, 2006 the City filed a Notice of Determination that the channel widening project will not have a significant effect on the environment.

PROCEDURAL ALLEGATIONS

38. This Court has jurisdiction over this action pursuant to California Code of Civil Procedure section 1094.5 and Public Resources Code section 21168.

39. Petitioners and its members have performed any and all conditions precedent to filing the instant action and have exhausted any and all available administrative remedies to the extent required by law by, *inter alia,* submitting written and oral comments on the Approval and the EIR at each stage of the administrative process. Petitioners have submitted written and oral comments to Respondents regarding compliance with CEQA and the CEQA Guidelines of the Approval and the EIR. Petitioners have standing to bring this action.

40. Petitioners and its members timely raised each and every significant substantive and procedural issue known to them in compliance with Public Resources Code section 21177 during the review process for the Approvals and the EIR. Petitioners and its members have requested that Respondents not grant the Tree Permit Approvals. Petitioners and its members have requested Respondents not certify the Lake Merritt Channel Wetlands and Widening Project EIR. Any further exhaustion would be futile.

41. Petitioners have complied with the requirements of Public Resources Code section 21167.5 by mailing a written notice of the commencement of this action to Respondents prior to filing this Petition and Complaint. A copy of the prior written notice provided to Respondents, with proof of service thereof, is attached hereto as Exhibit "A".

42. Petitioners have complied with the requirements of Public Resources Code section 21167.7 and Code of Civil Procedure section 388 by mailing a copy of the Petition and Complaint to the state Attorney General.

43. Petitioners have complied with Public Resources Code section 21167.6 by filing a Request For Preparation of the Record of Proceedings relating to this action at the time this Petition

and Complaint was filed. The request notified Respondents that Petitioners would elect to prepare the record or that the parties would agree to an alternative method of preparation.

44. Petitioners have no plain, speedy or adequate remedy in the ordinary course of law unless this Court grants the requested writ of mandate to require Respondents to comply with their duties and set aside the Tree Permit Approvals and the certification of the EIR. In the absence of such remedies, Respondents' actions continue to violate CEQA and Code of Civil Procedure 1094.5.

45. If Respondents are not enjoined from implementing the Approvals, certifying the EIR and from undertaking acts in furtherance thereof, Petitioners will suffer irreparable harm for which there is no adequate remedy at law in that Lake Merritt and the Lake Merritt area would be irrevocably altered and significant adverse impacts on the environment would occur. Petitioners and the general public have also been harmed by Respondents' grant of the Approvals without proper environmental review, by certification of an EIR that fails to accurately and fully inform interested persons and decision-makers of environmental impacts, by Respondents' failure to make required findings, and by certification of an EIR not supported by credible substantial evidence.

46. In pursuing this action, which involves enforcement of important rights affecting the public interest, Petitioners will confer a substantial benefit on the general public including residents of the City of Oakland, the San Francisco Bay Area and the State of California, and therefore will be entitled to attorneys' fees and costs pursuant to, *inter alia*, Code of Civil Procedure section 1021.5.

47. Petitioners brings this action pursuant to Public Resources Code section 21168 and Code of Civil Procedure section 1094.5, which require that an agency's approval of a project be set aside if the agency has prejudicially abused its discretion. Prejudicial abuse of discretion occurs where Respondents have failed to proceed in the manner required by law, where decisions are not supported by findings, or where findings are not supported by the evidence.

48. This action is timely filed.

STATEMENT OF LAW

49. CEQA is an integral part of every public agency's decisionmaking process. (Pub. Res. Code §21006.)

50. CEQA was enacted to protect the environment by the establishment of administrative procedures drafted to ensure that the long-term protection of the environment shall be the guiding criterion in public decisions.

51. CEQA requires public agencies to document and consider the environmental implications of their actions before formal decisions are made. (Pub. Res. Code §§ 21000, 21001.)

52. Projects carried out by public agencies are subject to the same level or review and consideration under CEQA as that of private projects approved by public agencies. (Pub. Res. Code §21001.1.)

53. All public agencies must prepare, or cause to be prepared, and certify the completion of an EIR on any project which they propose to carry out that may have a significant effect on the environment. (Pub. Res. Code §§21100, 21151.)

54. The purpose of an EIR is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided. (Pub. Res. Code §21002.1(a).) The EIR serves not only to protect the environment but also to demonstrate to an apprehensive pubic that it is being protected. (14 CCR §15003(b).)

55. The lead agency must consider the whole of an action, not simply its constituent parts. (14 CCR §15003(h).) The lead agency is responsible for considering the effects, both individual and collective of all activities involved in a project. (Pub. Res. Code §21002.1.)

56. A "project" under CEQA is the whole of an action, including activities directly undertaken by any public agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. (14 CCR §15378.) A project is an activity by a public agency, including but not limited to public works construction and related activities, as well as clearing or grading of land. (Id.)

57. A significant effect is a "potentially substantial, adverse change." (Pub. Res. Code §21068.) This means that an activity has a significant effect if it "has the potential to degrade the quality of the environment." (Pub. Res. Code §21083.)

FIRST CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY GRANTING THREE TREE REMOVAL PERMIT APPROVALS WITHOUT CONDUCTING PROPER ENVIRONMENTAL REVIEW

58. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

59. Respondents' grant of an exemption from CEQA and issuance of a Notice of Exemption for the Tree Permit Approvals are contradicted by substantial evidence in the record, did not follow the procedure required by CEQA, and were not supported by adequate Findings as required by CEQA and CCP 1094.5.

60. There is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

61. The City's reliance on the 2002 Initial Study for grant of the Approvals is improper as the 2002 Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

62. The City's reliance on CEQA Guideline 15162 to exempt environmental review is improper.

63. Respondents' actions in failing to conduct full environmental review in association with granting the three Tree Removal Permits constitutes a prejudicial abuses of discretion in that there is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

SECOND CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY CERTIFYING THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR

64. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

65. Respondents' certification of the Lake Merritt Channel Wetlands and Widening Project EIR constitutes prejudicial abuses of discretion in that Respondents failed to proceed in the

manner required by law as set forth below.

Count One: The Lake Merritt Channel Wetlands and Widening Project EIR Fails to Adequately Describe the Project.

66. CEQA Guideline section 15124 requires a description of the project that contains information needed for evaluation and review of the environmental impacts resulting from the channel widening project.

67. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including removal of all trees authorized by the Approvals.

68. The Lake Merritt Channel Wetlands and Widening EIR project description entirely omits mention of any tree removal as part of the channel widening project's technical and environmental characteristics.

69. The Lake Merritt Channel Wetlands and Widening EIR fails to include an accurate, stable and finite project description as it alternately describes the project as resulting in removal of 35 Protected Trees and 31 Protected Trees.

70. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including channel deepening.

71. CEQA requires that a proper project description be included in the EIR. Omission of this project description was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this stable, finite and accurate project description.

Count Two: Inadequate Description of the Environmental Setting

72. The EIR fails to adequately describe the environmental setting, as it exists before the commencement of the project, to establish a baseline for analyzing potentially significant impacts. (CEQA Guidelines §15125(a); San Joaquin Raptor v. County of Stanislaus (1994) 27 Cal. App. 4th 713, 722-723.)

73. The EIR fails to describe all trees surrounding Lake Merritt which constitute the environmental setting.

74. The EIR fails to describe all protected trees surrounding Lake Merritt which

constitute the environmental setting.

75. The EIR fails to describe all birds which utilize Lake Merritt as part of EIR's environmental setting.

76. The EIR fails to describe any birds-of-prey in the order Falconiformes which utilize Lake Merritt as part of the EIR's environmental setting.

77. The EIR fails to describe any birds-of-prey in the order Strigiformes which utilize Lake Merritt as part of the EIR's environmental setting.

78. The EIR fails to describe which passerine birds protected by the Migratory Bird Treaty Act utilize Lake Merritt as part of the EIR's environmental setting.

79. CEQA requires that a proper description environmental setting be included in the EIR. Omission of this environmental setting was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this description of environmental setting.

Count Three: Inadequate Analysis of the Channel Widening Project's Significant Environmental Impacts

80. An EIR must evaluate all significant environmental effects of a proposed project. (Pub. Res. Code §§ 21100(b)(1), 21061; CEQA Guidelines §§ 15126(a), 15143.) The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." (CEQA Guideline § 15143.) EIRs should be "prepared with a sufficient degree of analysis to provide decision-makers with information which intelligently takes account of environmental consequences." (CEQA Guidelines § 15151.) The analysis must include both direct and indirect impacts, as they occur in both the short term and the long term. Identification of a projects' significant environmental impacts is a central purpose of an EIR and is necessary to implement CEQA's policy. (Pub. Res. Code §§ 21002.1(a), 21003.1(b).) Under CEQA, the EIR cannot defer analysis of impacts until a later date. This EIR's analysis of significant impacts fails to meet these standards.

81. The EIR improperly fails to include analysis of the channel widening project's impacts on nests of birds of prey in the order Falconiformes or Strigiformes.

82. The EIR improperly fails to include analysis of the Approvals' impacts on birds of prey in the order Falconiformes or Strigiformes and their nests and eggs.

83. The EIR fails to accurately assess the impacts of channel deepening.

84. The EIR fails to adequately analyze the impacts of loss of canopy and foraging, nesting and roosting habitat for migratory birds.

85. CEQA requires that such proper analysis of significant environmental impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudically abused their discretion in certifying the EIR, which failed to include this analysis.

Count Four: Inadequate Analysis of Cumulative Impacts

86. An EIR must also analyze and discuss significant cumulative impacts of the project. (CEQA Guidelines § 15130; Pub. Res. Code § 21083(b).) Cumulative impacts are "two or more individual effects which, when viewed together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines §15355.) The individual effects may be changes resulting from a single project or a number of separate projects. (CEQA Guidelines § 15355(a).) The cumulative impacts analysis is vital in preventing impacts which are individually minor but cumulatively considerable from overwhelming the environment.

87. An EIR must include either (A) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) a summary of projections contained in an adopted general plan or related planning document, or in a prior certified environmental document which described or evaluated regional or areawide conditions contributing to the cumulative impact. (CEQA Guidelines § 15130(b)(1).)

88. The EIR's analysis of cumulative impacts violates CEQA. The fundamental flaws in its analysis include but are not limited to the following:

89. The EIR fails to analyze the cumulative impact of this project in combination with all closely related past, present and reasonably foreseeable future projects in determining impacts to biological resources.

90. The EIR fails to provide any analysis of the cumulative impacts to geology and soils.

91. The EIR fails to provide any analysis of the cumulative impacts to hydrology and water quality.

92. The EIR contains neither the cumulative project list nor the projection summary required by CEQA.

93. The EIR's cumulative impact approach —determining first "the cumulative impact area" and then determining whether the project impacts, examined alone, is cumulatively considerable—contradicts CEQA and CEQA Guidelines 15065, 15130 and 15355.

94. The EIR applies an incorrect standard for determining cumulative biological resources impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit" to biological resources.

95 The EIR fails to consider the 226 trees that will be removed by the Approvals as part of its consideration of the cumulative biological resources impacts.

96. The EIR applies an incorrect standard for determining cumulative hydrology and water quality impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit to the environment."

97. The EIR fails to provide a reasonable explanation related to the geographic scope of the area affected by each cumulative effects analysis, as required by CEQA.

98. The EIR's cumulative impact analysis avoids the CEQA requirement that even where an incremental effect that is determined not to be "cumulatively considerable," the EIR must still briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

99. CEQA requires that such analysis of cumulative impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Five: Inadequate Analysis of Alternatives

100. CEQA Guideline section 15126.6 requires an EIR to describe and consider "a reasonable range of alternatives to the proposed project." Section 15126.6 further states that the "range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to

set forth only those alternatives necessary to permit a reasoned choice."

101. The EIR fails to analyze a reasonable range of project alternatives or to adopt feasible alternatives to substantially lessen significant adverse effects on the environment as the EIR only considers one alternative: the No-Project/No-Build Alternative.

102. CEQA requires that such analysis of alternatives be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Six: Respondents Improperly Purported to Tier the Draft EIR to "Previous Environmental Analysis" and the 2002 Initial Study

103. CEQA guideline section 15152(a) allows tiering, which includes "using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project." When tiering is used, the later EIRs or negative declarations shall refer to the prior EIR and state where a copy of the prior EIR may be examined. CEQA Guideline § 15152(g). The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier EIR. *Ibid.*

104. The Draft EIR purports to tiered off of "previous environmental analyses," including the 2002 Initial Study for all projects proposed under Measure DD, which determined that "no removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

105. The EIR violates CEQA because it improperly tiered to the 2002 Initial Study, which contains no discussion of the tree removal.

106. The EIR violates CEQA because CEQA requires tiering off of other approved EIRs, not tiering off of vague "previous environmental analysis" or Initial Studies.

107. Tiering as purported here was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying an EIR which improperly tiered.

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THIRD CAUSE OF ACTION

CREDIBLE SUBSTANTIAL EVIDENCE DOES NOT SUPPORT THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR CONCLUSIONS

108. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

109. Respondents' actions in certifying the EIR constitutes a prejudicial abuses of discretion in that there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts—given that the widening project will result in the removal of 35 protected trees and given that the widening project, along with other past, present and reasonably foreseeable future projects, will result in the removal of over 225 trees in and around Lake Merritt.

FOURTH CAUSE OF ACTION

IMPROPER SEGMENTATION OF THE PROJECT

110. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

111. The EIR fails to present or evaluate an accurate project description, and fails to describe the whole of the project, including all activities within the scope of the project. *See e.g. County of Inyo v. City of Los Angeles* (1977) 71 Cal. App. 3d 185, 193; CEQA Guidelines 15124 and "Discussion" following and 15378. Instead, the project description is "piecemealed," and thus avoids analysis of the entire project. (*See e.g. Citizens for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal. App. 3d 151).

112. The 2002 Initial Study, off of which the EIR is tiered, examines all Measure DD projects, including the Lake Merritt Projects (*i.e.*, the 12th Street Reconstruction Project, the Lakeside Drive Project and the Lakeshore Avenue/El Embarcadero Project); projects covered by the Estuary Policy Plan (*e.g.*, the Oak to Ninth project and the Jack London Square Redevelopment project); projects that would improve a number of creeks in Oakland (*e.g.*, Sausal Creek, Lion Creek of Palo Seco Creek, Cinderella Creek and Shepard Creek); and projects located within the Coliseum Area Redevelopment Plan.

113. The channel widening project is a small part of the larger 12th Street Reconstruction Project, which, in turn, is a small part of the larger Lake Merritt Projects, which, in turn, are a small part of the larger Measure DD-funded projects.

114. By describing the project as including only the Lake Merritt Wetlands and Channel Widening piece of the project and by analyzing only the environmental impacts resulting from the Lake Merritt Wetlands and Channel Widening segment of the project, the EIR engages in improper segmentation and fails to include all activities within the scope of the project.

FIFTH CAUSE OF ACTION

RESPONDENTS FAILED TO MAKE ADEQUATE FINDINGS

115. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

116. CEQA requires that no agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur: (a) The public agency makes one or more of the following findings with respect to each significant effect: (1) changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment; (2) those changes or alterations are within the responsibility and jurisdiction of another agency and have been, or can and should be, adopted by that other agency; (3) specific economic, legal, social, technological, or other considerations, make infeasible the mitigations or alternatives identified in the EIR; and (b) with respect to significant effects which were subject to a finding under paragraph (a) (3), the agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

117. Findings providing an analytical route between the evidence and an agency's ultimate conclusions are also required pursuant to Code of Civil Procedure section 1094.5.

118. Respondents failed to make adequate findings in regards to each significant effect identified by the Lake Merritt Channel Wetlands and Widening Project EIR. The findings are inadequate as they do not explain how proposed mitigations will mitigate the project, do not explain

why the facts in the record support the proposed mitigation, do not provide a logical explanation establishing the relationship between the findings and the evidence, because a separate finding is not made for each significant impact, and because the findings are not supported by substantial evidence.

119. Respondents failed to make adequate findings for grant of the three Tree Removal Permits explaining why the facts in the record support the City's decision that the Tree Removal Permits are exempt from CEQA review and because the findings are not supported by substantial evidence.

120. Respondents' failure to make adequate findings constitutes a prejudicial abuse of discretion in violation of Code of Civil Procedure section 1094.5, Public Resource Code section 21081 and CEQA Guidelines 15091.

SIXTH CAUSE OF ACTION

RESPONDENTS VIOLATED FISH AND GAME CODE SECTION 3503.5 BY AUTHORIZING DESTRUCTION OF NESTS AND TAKE OF BIRDS IN THE ORDER FALCONIFORMES AND STRIGIFORMES

121. Petitioners incorporate by reference the allegations set forth in the preceding paragraphs.

122. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.

123. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons.

124. Birds of prey in the order Strigiformes include owls.

125. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will remove 31 trees which provide potential nesting habitat for species of raptors and birds of prey, including the red-tailed hawks and red-shouldered hawks.

126. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will result in lose of nesting habitat.

127. The Lake Merritt Channel Wetlands and Widening Project EIR proposes a mitigation which includes destroying nests of birds in the orders Falconiformes or Strigiformes (birds-of-prey)

once young birds have fledged.

128. The Approvals will result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds.

129. In granting the Approvals and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

PRAYER FOR RELIEF

WHEREFORE, Petitioners and Plaintiffs Pray for Relief as Follows:

1. For a peremptory writ of mandate directing Respondents to set aside and vacate 1) the Tree Removal Permit approvals Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006, and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

2. For a peremptory writ of mandate directing Respondents to fully comply with CEQA prior to approving any Tree Removal Permit in and around Lake Merritt, including but not limited to Tree Removal Permits, Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006;

3. For a peremptory writ of mandate directing Respondents to make comply with CEQA in conjunction with the Lake Merritt Channel Wetlands and Widening Project by preparing an adequate EIR, recirculating such adequate EIR for public comment, and take any other action as required pursuant to section 21168.9 of the Public Resources Code prior to granting any future approvals for the widening project.

4. For a peremptory writ of mandate directing Respondents to make adequate findings in support of 1) any approval of Tree Removal Permits in and around Lake Merritt and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

5. For a preliminary and a permanent injunction restraining all Respondents and their agents, servants and employees, and all others acting in concert with them or in their behalf, from undertaking any physical construction, demolition or development, issuing any construction, demolition or development approvals or permits, including without limitation granting or approving any funding, or taking any other action in any way to implement the project, pending full compliance with CEQA, Code of Civil Procedure section 1094.5, and all other requirements of law.

6. For costs of the suit incurred herein.

7. For attorneys' fees pursuant to section 1021.5 of the Code of Civil Procedure; and

8. For such other and further relief as the Court deems just and proper.

DATED: August 7, 2006

LAW OFFICES OF BRIAN GAFFNEY

By: _____
Brian Gaffney
Matt McFarland

Thornton, Elois A

From: JACQUEE CASTAIN [jacqueec@sbcglobal.net]
Sent: Monday, January 22, 2007 4:38 PM
To: Elois A. Thornton
Subject: Draft EIR for Measure DD

Dear Elois:

I am trying to FAX you two articles that pertain to two different issues that are listed as pending projects under Measure DD.

The first article is a copy of a report in the Oakland Tribune that appeared on Sunday, Jan. 29, 2006. It describes the achievements of a Bay Area African-American All-Star swimming team, and the significance the team brings to our youth. We are truly supportive of the East Oakland Sports Complex being developed and the hope and promise it will give for events that will keep our youth in positive activities. Please list our community as a strong supporter of the Sports Complex.

The second article shows pictures of a city owned **"toxic creek"** that crosses 85th Avenue close to Enterprise Way. It is next door to the Just Desserts parking lot and has weeds in the center of the creek that are close to 8 feet high. I tried to submit a request for funds to clean up the site in 2004 but the request was denied. This hazardous site is causing poor air quality in this community and needs to be removed.

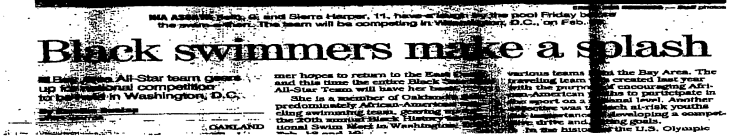
Please consider both of these issues as projects to be evaluated in the Measure DD Draft EIR. Thank you.

Jacquee Castain
Webster Tract Neighbors Association
(510) 568-5333

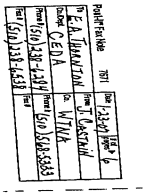
1/23/2007

swim-a-thon fund-raiser for the Black Star Line All-Star swim team in Oakland on Friday afternoon.

Black swimmers make a splash



Swimmers go for nationals



TEL:510382-9726 P.04

TEL:510382-9726 P.03

Coliseum Redevelopment Project Area
(Formerly IMO DeLaval Turbine Engine Plant site)
(located at 550 - 85th Ave.)

In 1995 the Oakland City Council designated the area from High Street to the Oakland/San Leandro border below International Boulevard as the Coliseum Redevelopment area. It was so designated as a means of rebuilding the numerous closed industrial plants to more productive uses. The largest, most toxic site was the 60.5 acre IMO DeLaval Turbine Plant which had been closed since 1985. In 1997 the company that owned the site had the land subdivided and sold it to seperate businesses.

There are several creeks on the property. The Regional Water Quality Control Board was responsible for the oversight of the toxic cleanup and creek cleanup. However, the last site to be redeveloped was the Just Desserts plant on 85th Avenue next to a creek (un-named) which is a part of the Elmhurst tributary. The Water Quality Control Board informed the community that the cleanup of the creek was the responsibility of either the Alameda County Flood Control District or the City of Oakland. It was later determined that the city was the owner of the creek as part of the land subdivision and responsible for the cleanup.

This creek is now the most blighted piece of property in this beautifully redeveloped 60.5 acre. For years it has been allowed to become overgrown and unsightly with tall weeds growing all the way to the sudewalk on 85th Avenue. A wrought iron fence has been placed on both sides of the creek to seperate it from the parking lot for the warehouses on the east side of the creek, and Just Desserts driveway on the west side of the creek.

THE CITY OF OAKLAND NEEDS TO SPEND SOME MONEY TO CLEAN UP THIS CREEK (which they own) and take some pride in maintaining it, as the other property owners have in maintaining their property.

Jacquee Castain, Webster Tract Neighbors Association (510) 568-5333

CREEKS AND WATERWAYS RESTORATION AND ACQUISITION

MAILING LIST

To be on our mailing list for future public meetings and for creek project proposals write to us at: Watershed Improvement Program, City of Oakland, 250 Frank Ogawa Plaza, #5301, Oakland, CA 94612 or e-mail us at watersheds@oaklandnet.com

CREEK RESTORATION OR ACQUISITION PROJECT PROPOSAL

To submit a project proposal to be considered, provide the following information to the Watershed Improvement Program, City of Oakland, 250 Frank Ogawa Plaza, #5301, Oakland, CA 94612

Name **Jacquee Castain - for a creek in the Elmhurst Tributary.**

Location **85th Avenue and ~~Edgewater~~ Enterprise Way.**

Site map and or photo **Photos enclosed showing the blighted creek located in the redeveloped industrial park in ~~Elmhurst~~.**

Project type **Creek clean-up.**

Project description **Creek restoration with removal of toxic and hazardous materials. Re-plant the creek with local plants.**

Estimated costs **Unknown**

Potential matching funds or volunteer resources **City funds and volunteers**

Community interest and support **This creek is the only blighted site in this newly developed industrial park. Since it is owned by the city they should take some pride in keeping it clean and well maintained.**

For more information about the City of Oakland Watershed Program see our website at www.oaklandpw.com/creeks

DEADLINE FOR PROPOSALS FOR 2004/05 PROJECT LIST

May 17, 2004

PWA-ESD Watershed Improvement Program *3/18/04*

Thornton, Elois A

From: Naomi Schiff [Naomi@17th.com]
Sent: Monday, January 22, 2007 12:42 PM
To: eathornton@oaklandnet.com
Cc: Valerie Garry; Joyce Roy
Subject: DD scoping comments

Dear Ms. Thornton,

I am writing as a board member of Oakland Heritage Alliance, delegated to attend the DD coalition meetings, and as a participant in the Lake Merritt Master Plan discussions, a few years ago.

Lake Merritt is a National Historic Landmark; historic and cultural impacts upon it must be reviewed carefully along with the other environmental impacts.

As regards structures, the original planning for the DD projects did take into consideration the proper restoring of the historic boathouse (now underway), and the relationship of DD projects to the Camron Stanford house. We hope the new EIR will take into consideration the condition and views of historic structures and landscapes around the lake such as the Eighteenth Street landing, the Oakland Auditorium/Kaiser Convention Center, the Oakland Museum, the "pergola" near El Embarcadero, connection to the Cleveland Cascade, relationship to the Lakeshore Library, Alameda County Courthouse, Vets Memorial, and the fire alarm building, and maintaining the historic landscape as a pleasant park environment, oriented toward pedestrian and bicycle users as well as those in automobiles.

In its role as a designated wildlife sanctuary, the land around the lake is significant for its use as a bird and wildlife habitat. We assume that impacts to wildlife are to be included in the study.

One way to mitigate such delays as the uproar about tree preservation would be to have a proactive plan for open and ongoing public discussions about the project as it moves ahead, with full information provided to the public about the plans.

We would like to point out that in the immediate vicinity of the DD projects area, there are a number of buildings and open spaces of historic or environmental importance. Where there is significant impact, we hope it will be reviewed. Examples include the Snow Park area, including 244 Lakeside, the Regillus Apartments, and Schilling Garden, historic buildings around Bellevue Avenue, and the relationships between the channel area and the planned park improvements.

We look forward to working with the EIR team, and stand ready to provide assistance wherever we are able. Please contact me or the OHA office (763-9218) and we will be eager to help.

Thank you so much,

Naomi Schiff
Member, Oakland Heritage Alliance Board of Directors Participant, DD Coalition

--
Naomi Schiff
Seventeenth Street Studios
1761 Broadway
Oakland, CA 94612

510-835-1717
fax: 510-835-1820

Visit www.17th.com

Thornton, Elois A

From: Joseph Matera [dzntmatera@hotmail.com]
Sent: Monday, January 22, 2007 1:38 PM
To: eathornton@oaklandnet.com
Subject: Case # ER060017 - Comments on Scope of new EIR for Lake Merritt Prop. DD Project

Meadow Area Comparison.jpg (22..

Dear Oakland Community and Economic Development Agency, Planning & Zoning Div.,

I am a member of the Save Our Meadow citizen group that attempted to save the existing meadow at 17th Street and Lakeside Drive in Lake Merritt Park. With the help of several landscape architects, our group created a plan (Option 2 - see attached) for the Lakeside Drive/Boathouse part of the Prop. DD project that saved more than twice as much meadow space as the plan (Option 1) that the city eventually adopted (see attached drawing). The city council rejected our plan because the restauranteur the city council wanted as the future tenant in the Boathouse said he (the restauranteur) did not like our plan, but could accept the plan that the Prop. DD city staff supported in its staff report.

I'm hoping that this new EIR will force the city to reconsider adopting the Option 2 plan that the Save Our Meadow group developed to save this rare and important downtown park space. Please note also that both Option 1 and Option 2 provide about the same number of parking spaces for whatever use is evenually made of the Boathouse space, but Option 1 permanently eliminates the meadow and turns it into a narrow strip which can no longer reasonably be called a "meadow". Also, the city's own Bicycle and Pedestrian Advisory Committee overwhelmingly favored Option 2 (by a vote of 7 for Option 2, 0 for Option 1). Option 2 is clearly safer for pedestrians and bicyclists.

I have other drawings that I can send showing ways that Option 2 can be reworked in ways that preserve the meadow space while adding more parking (if this is necessary) and/or moving the garbage area for the Boathouse.

The values we thought we were voting for when we approved Prop. DD - preserving, enhancing, and enlarging park space in Lake Merritt Park - should be favored over the desires of a proposed commercial tenant in the Boathouse space.

In addition, as construction and renovation has been going on at the Boathouse over the last few weeks, I have noticed an alarming development. The shoreline in front of the Boathouse has been extended several feet into the Lake, i.e. Lake Merritt has been filled in to accommodate what appears to be a new patio area for the proposed restaurant in the Boathouse. A new seawall has been constructed several feet past the old shoreline, the area has been drained, and the contractor has started to fill in the drained area. This seawall extends along the entire frontage of the Boathouse and several feet beyond on each side of the Boathouse. A significant amount of Lake Merritt has thus disappeared. I am hoping the new EIR will consider this taking away of Lake area, and require that the Lake be restored to its former area.

Joe Matera
Save Our Meadow community group

Get Hilary Duff's homepage with her photos, music, and more.
http://celebrities.live.com

From: McGuire, Linda [LMcGuire@steefel.com]
Sent: Monday, January 22, 2007 2:10 PM
To: eathornton@oaklandnet.com; taanders@up.com; kcb@cpuc.ca.gov
Subject: FW: Scanned document from CanonScanner per J. Ferrucci's request

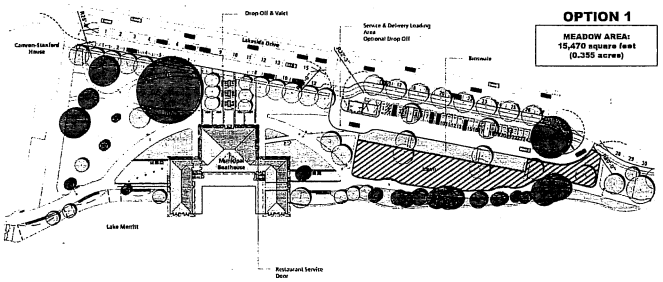
Canon Scanner.pdf
(326 KB)

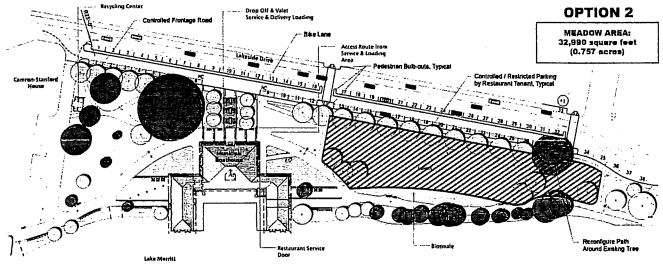
Forwarded at Joe Ferrucci's request.

Linda McGuire
Legal Secretary to
Steve Atkinson, Miriam Montesinos, Joe Ferrucci Steefel, Levitt & Weiss A Professional Corporation One Embarcadero Center, 30th Floor San Francisco, California 94111
Tel: (415) 788-0900
Fax: (415) 788-2019
lmcguire@steefel.com
www.steefel.com

This email, including any attachments, and their use by any recipient are subject to terms, conditions, restrictions and disclaimers that can be reviewed by clicking here.

-----Original Message-----
From: CanonScanner@Steefel.com [mailto:CanonScanner@Steefel.com]
Sent: Monday, January 22, 2007 2:04 PM
To: McGuire, Linda
Subject: Scanned document from CanonScanner





STEEFEL, LEVITT & WEISS
A Professional Corporation

January 22, 2007

19869

VIA EMAIL AND FACSIMILE

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612
510-238-6284 (phone)
510-238-6538 (fax)
eathornton@oaklandnet.com

Re: Notice of Preparation for the Draft Environmental Impact Report on the Measure DD Project

Dear Ms. Thornton:

We represent Union Pacific Railroad Company ("UP"). Because UP and its predecessors have been operating throughout the City of Oakland for many decades, UP has been following with interest the Measure DD Project (the "Project"). UP appreciates this opportunity to comment on the City's Notice of Preparation ("NOP") of a Draft Environmental Impact Report ("Draft EIR") on the Project. By this letter, UP presents its comments.

Many people know about UP's distinguished history. UP played a prominent role in the development of the first transcontinental railroad in the late 1860's. What many people do not know is that today, UP remains a significant owner of railroad property and a major freight transporter in the western two-thirds of the United States. In fact, UP is the largest railroad company in North America.

Of particular relevance to the Project, UP owns a railroad yard, a railroad line and right of way in Oakland (the "UP line") that roughly parallels the I-880 freeway. UP operates freight services, and Amtrak operates passenger services, on the UP line. The UP line experiences a very high volume of rail traffic, as it serves the entire metropolitan Bay Area and is a major transportation corridor through Northern California.

Given UP's significant presence throughout the City, UP takes great interest in the City's growth and improvement. It is with this perspective that UP respectfully submits the comments in this letter. On UP's behalf, we would welcome an opportunity to sit down together with City officials and staff to discuss any aspect of this Project or any other project that may

relate to UP's property or operations within the City of Oakland.

1. Oakland and UP: the Big Picture

Before addressing the Measure DD Projects specifically, we thought it might be helpful to comment, more generally, on the relationship between the City of Oakland and UP. The City sits at the center of the bustling and economically vibrant San Francisco Bay Area. The Oakland waterfront boasts one of the busiest containerized shipping ports in the country, and downtown Oakland is a growing business center. Oakland is also a city with a wide variety of residential neighborhoods, from which residents commute to workplaces in Oakland, San Francisco, Silicon Valley, and beyond. Without a doubt, more and more people, cars, and trains will travel into and out of Oakland every day over the coming decades.

As the City continues to flourish, however, the capacity of its transportation network is not likely to expand significantly, due to, at a minimum, space limitations. There is no foreseeable place, for example, to build new freeways or streets in the midst of the City's patchwork quilt of neighborhoods. Accordingly, freeways and streets will experience more traffic over time, and we can expect that as a result, increasing numbers of businesses and people will rely on rail services to bypass congested roadways. Thus, it would seem to be in the City's best interest to take affirmative steps now that will protect and enhance those rail lines and services, so that they will continue to serve the City, its residents, and its economy effectively and efficiently in the near and distant future.

At the risk of stating the obvious, development near the UP line can negatively impact rail services and create unintended consequences that are in neither UP's nor the City's best interests. For example, new offices, retail establishments, housing, and other land uses, such as near Jack London Square, predictably attract more cars and pedestrians to the areas around the UP line. Cars and pedestrians must cross the UP line at at-grade crossings, and people sometimes trespass onto the railroad right of way. In addition to the obvious safety concerns of which UP remains vigilantly aware, these factors also have the result that trains may be forced to proceed more slowly through the City, and/or to make more frequent emergency stops, which makes rail service less effective and efficient. Moreover, the interaction of people and trains may make people all the more aware of the natural and unavoidable features of rail service, including noise, mechanical odors and vibration.

Ever realistic, UP recognizes that as Oakland continues to grow and thrive, new development and re-development is likely to continue to occur on sites near the UP line in Oakland. In general, UP requests that the City seek to mitigate the impacts of new development on UP's line and rail services by requiring appropriate mitigation measures. Those measures may vary depending upon the nature of the proposed development. Such measures include, for example, requiring grade-separated roadway bridges and sidewalks where it is necessary for vehicles and people to cross the UP line, sound walls, fences and other barriers, and public education. UP would welcome the opportunity to work collaboratively with City officials and

staff to develop long-range public policies to help guide new development near the UP line, with the goal of avoiding or reducing negative impacts.

2. Measure DD Improvements Near the UP Line

Many of the foregoing global concerns arise, with more specificity, in the context of the Measure DD Project. The Project includes a list of improvements that will be funded by Measure DD. Based on the NOP, we have identified several such improvements that would be located close to the UP line. They include: (1) the Lake Merritt Channel improvements; (2) the Oakland Waterfront Trail and Access improvements; (3) the East Oakland Aquatic, Sports, and Recreation Complex improvements; and (4) creek restoration at specified sites along Sausal and Seminary Creeks. For each of these improvement projects, UP requests that the Draft EIR carefully consider possible impacts on the UP line and set forth appropriate mitigation measures.

3. Lake Merritt Channel Improvements

The Project includes improvements along the Lake Merritt Channel (the "Channel") that are "intended to improve water flow, provide small boat passage, enhance bicycle and pedestrian access, [and] restore wetlands." (NOP, at 2.) In addition, the restrictive culvert at 10th Street will be replaced with a clear-spanning bridge, and a gated by-pass channel will be constructed around the 7th Street Flood Control Station. (*Id.*) The UP line crosses a bridge that spans the Channel, at point close to the mouth of the Channel.

The Draft EIR should discuss how these improvements could affect the UP line and bridge, as follows. First, because the improvements could disturb the soil along the Channel, the Draft EIR should discuss whether they could structurally or physically impact the UP line or bridge. The Draft EIR also should discuss whether the improvements would involve excavation of potentially contaminated soils, and if so, whether any UP workers or patrons could become exposed to such contaminants.

Second, the pedestrian, bicycle, and small boat improvements likely will attract more people to the area immediately surrounding the UP line. More people may walk or bike across the UP line, and/or walk, bike, or boat underneath the UP bridge. In addition, some of these individuals may trespass onto the UP line. These potential impacts raise concerns about pedestrian safety and interference with rail operations. In addition, people near the UP line would experience the typical noise, mechanical odors and vibration that come with freight and passenger rail service along the UP line.

Third, with respect to the 10th Street bridge project and the bypass channel project, the Draft EIR should examine whether any construction-related traffic impacts would result. Specifically, would these projects divert traffic to nearby streets, such as 5th Avenue, where the UP line crosses the roadway at grade? Would they increase queuing of cars at intersections, such that cars would be more likely to idle over the tracks? Such traffic impacts

not only would affect rail operations, but also could have safety implications for motorists and pedestrians.

Fourth, the Draft EIR should examine whether either the 10th Street bridge project and the bypass channel project would alter the water levels or water quality in the Channel in such a manner as to affect the UP line or bridge.

4. Oakland Waterfront Trail and Access Improvements

The Project includes development of a hiking and biking trail along the Oakland waterfront, including the related acquisition of waterfront properties and remediation of soil contaminants. (NOP, at 4.) The trail would run from roughly from Broadway to 60th Avenue. (*Id.*, at 7.) The distance between the trail and the UP line would vary from one point to another. (*Id.*) In some places, such as in the vicinity of the mouth of the Channel, the trail would be located immediately adjacent to the UP line. (*Id.*) In other places, as in the area south of High Street, the distance increases to more than one-half mile. (*Id.*) In addition, the trail would actually cross an active freight service line that runs from the UP line west along Fruitvale Avenue into the City of Alameda. (*Id.*)

The proposed waterfront trail raises several concerns that the Draft EIR should address. First, the trail would attract more pedestrians and cyclists to the area around the UP line. Some of those people would walk across the UP line to reach the trail at various points, and others might trespass onto the UP line itself. These potential impacts raise concerns about pedestrian safety and interference with rail operations. In addition, people near the UP line would experience the typical noise, mechanical odors and vibration that come with freight and passenger rail service along the UP line.

Second, remediation of contaminated soil along the waterfront raises the concern that UP workers or rail patrons could be exposed to contaminants. On a related topic, because remediation would probably involve soil disturbance, the Draft EIR should examine whether any improvements done near the UP line would structurally or physically impact the tracks or any other improvements in UP's right of way.

5. East Oakland Aquatic, Sports, and Recreation Complex Improvements

The Project includes a major expansion of the Ira Jenkins Park/Recreation Center (the "Center"), located at the corner of Edes and Jones Avenues. (NOP, at 5.) The UP line crosses several roadways at-grade to the immediate east of the Center, including, but not limited to, the ones at 85th Avenue and 96th Avenue. (*Id.* at 8.)

The Draft EIR should examine whether traffic would increase at these at-grade crossings as a result of the Project, including whether nearby queuing from roadway intersections would cause vehicles to idle over the tracks while waiting at traffic lights. Any such impacts

would raise concerns about safety and rail operations.

In addition, patrons of the Center may walk or jog in the neighborhood around the Center, meaning that some likely would walk across the UP lines at the aforementioned at-grade crossings, or might trespass onto the UP right of way itself. This increase in pedestrian activity near the UP line could implicate pedestrian safety around the tracks.

6. Restoration Along Sausal and Seminary Creeks

The Project includes creek restoration activities at designated sites throughout Oakland. (NOP at 5.) Creek restoration activities include bank stabilization, erosion control, hydrology restoration, riparian habitat restoration, introduction of native wildlife, and public education displays (implying public access). (*Id.*) Figure 3 in the NOP indicates that two creek restoration sites would be located approximately a mile or less upstream from the UP line, one on Sausal Creek and another on Seminary Creek. (*Id.* at 9.)

These creek restoration activities raise several issues that the City ought to address in the Draft EIR. The first is whether the public access improvements would attract any additional pedestrians or cyclists across or around the UP line. If so, the Draft EIR should examine the possible safety impacts.

With respect to bank stabilization, erosion control, hydrology restoration, riparian habitat restoration, and introduction of native wildlife, UP concerns are similar to those stated with respect to other aspects of the Project, as discussed above. Specifically, if these improvements involved excavation of potential soil contaminants, could such contaminants flow downstream, such that UP workers or rail patrons would suffer exposure? In addition, the Draft EIR should consider whether any of these improvements would change downstream water levels or water quality.

UP will appreciate it if the City, as lead agency, gives due consideration to the above concerns. UP looks forward to having an opportunity to review the Draft EIR on the Project when it becomes available for public comment. More importantly, UP looks forward to working in collaboration with the City to ensure that all future development near the UP line is compatible with the rail services that will continue to serve the City for years to come.

Please give notice to UP of all future developments with respect to the Project as follows:

Mr. Terrel Anderson
Manager of Industry and Public Projects
Union Pacific Railroad Company
10031 Foothills Boulevard
Roseville, California 95747-7101

With a copy to:

Lisa M. Carvalho, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 30th Floor
San Francisco, California 94111

Please do not hesitate to contact our office if you have any questions or concerns.

Sincerely,

Lisa M. Carvalho

Lisa M. Carvalho

LMC/JF

cc: Mr. Terrel Anderson (via email in .pdf format)
Union Pacific Railroad Company
Mr. Kevin Boles (via email in .pdf format)
CA Public Utilities Commission

19869:6551079.4

Thornton, Elois A

From: RBishop747@aol.com
Sent: Monday, January 22, 2007 11:36 AM
To: Eathornton@oaklandnet.com
Cc: jim@virtualperfection.com
Subject: DD Bond Measure EIR scoping comments

Elois Thornton,

I am a Member of the Measure DD Committee since its inception. I have a three issues about the trees. My three issues are **tree removal**, introduction of new **non-native species**, introduction of species known to be **highly allergenic**.

I feel that some of the trees slated for removal should remain. I am also Bicycle Safety Instructor and know that the bike lane around Lake Merritt can have turns and curves in the path if done correctly. The Bike Route should not be the cause of removal of trees. I also am concerned about the trees at the end of International Street.

Next is the suggested introduction of non-native new trees. From the plans I have seen I noticed that there is to be an introduction of many new non-native species. I am for diversity, but this can be carried to extreme easily.

The highly allergenic Gingko in particular is of concern. The plan shows the Gingko to be planted in a continuous line around a major portion of Lake Merritt. This type of formal planting replicates issues encountered when species are planted in groves and increases the likelihood of a walker having an allergic reaction due to increased male pollen of one species in the vicinity. Only the Gingko male species, the pollen producer, will be planted. There has been no consideration for the introduction of highly allergenic species and the reaction on the populace. There has been no consideration that grove plantings increase the number of allergic reactions. Approximately 20% of the U.S. population has allergies and consideration should be given. The Gingko has a high level of allergens and has a rating of 10 on a 10 scale to cause allergic reactions in those that have allergies..

Please direct the specifier of the plant materials to do their homework and choose species more benign. All trees have pollen, but not all trees have the kind of pollen that rates high in causing allergic reactions.

Sincerely,

Ron Bishop - Architect - AIA
Bishop Architecture
Bicycle Safety Instructor - LCI
[510] 652-4667

From: Millsmont Homeowners Association [MHA@chimescreek.com]
Sent: Sunday, January 21, 2007 11:17 PM
To: eathornton@oaklandnet.com
Subject: Case number ER060017 Comments on the NOP
To: Elois Thornton, Planner IV
Community and Economic Development Agency
250 Fran H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

fax: 510-238-6538
email eathornton@oaklandnet.com

Re: Case number ER060017
Project: Measure DD

SUBJECT: Comments on the NOP of a DEIR for Measure DD Project

On behalf of the Millsmont Homeowners Association representing property owners along Chimes Creek in the Lion Watershed, I wish to request that Chimes Creek be considered for funding under Measure DD for "the improvement of water quality, hydrology and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship." The headwaters of Chimes Creek is located just above the recently completed Leona Quarry development in the hills above I-580. As part of the drainage improvements for the Leona Quarry project, drainage from the Ridgemont watershed which had been creating havoc in the Leona Canyon since the 80's, was diverted to the detention pond at Leona Quarry, and hence to Chimes Creek. Combined with additional subsurface and surface runoff from this development, Chimes Creek in just a few short years has experienced an increase in the amount of urban runoff, sedimentation and erosion of its banks.

Along with Horse Shoe Creek, Chimes Creek is a major tributary to Lion Creek which travels through Mills College and along the newly constructed Lion Creek Crossings Residential Development (the former Coliseum Gardens) on its way to the Estuary. While creek projects are underway to daylight and restore previously channelized creeks to a "natural" meander, such efforts may amount to little more than window dressing if upstream environments are neglected and left to deteriorate to the point where they too, must be channelized to control erosion and pollution.

Although most of Chimes Creek runs through and behind private property, there are a number of public access easements, typically where City storm drains feed into the creek through concrete pipes and at City constructed revetments. The terminus of Nairobi Place is City owned property, however, and in the past supported a pedestrian bridge that allowed the public to walk across to Hillmont Ave. Presently, an EBMUD water main is the only facility that spans the creek at this location (aside from an exposed sewer main) -- and the area is not particularly conducive to *wholesome* public recreational use. Aside from tending to occasional sewage spills in and around this location, the City has paid little attention to the maintenance or improvement of this area. The result has been to create a security hazard and a lost opportunity for public access to a creek that has remained remarkably natural in an increasingly urbanized area.

Thank you for providing the Millsmont Homeowners Association the opportunity to comment on the scope of the Measure DD EIR.

Sincerely,

Chiye Azuma
Secretary
Millsmont Homeowners Association

Thornton, Elois A

From: Anne.Symanovich@wellsfargo.com
Sent: Friday, January 19, 2007 2:04 PM
To: eathornton@oaklandnet.com
Cc: gofindnancy@yahoo.com
Subject: DD Bond Measure EIR scoping comments

Dear Ms. Thornton –

It is terrific to learn that the City of Oakland is reopening the EIR process. I'm sure that a new plan for enhancing the Lake and its wildlife can be developed.

I'm really hoping that the planners will give absolute top priority to BIG TREES. These are the foundation of everything! We need them to hold the soil together, clean the air, and shelter all manner of birds and little critters. That's a lot of services! Little trees are very nice – and I'm hoping that a lot of little trees will be planted so we can have more big trees later on – but there's just nothing that can replace the huge canopies of our older trees.

Also, trees = money, and big trees = big money. Why else would newspaper stories describe nice streets or affluent suburbs as "leafy"? This is shorthand for "high-rent district". Big trees are such an amenity that they are worth big bucks to property holders. (Not that you could get a big tree planted next to your house even for really big bucks – instead, you'd have to plant a smallish one and wait a long time.) Lake Merritt's big trees are just stunning. How could we even think of giving up these treasures? Can we not plan around them?

Please, let's get a plan that showcases our beloved giants and that opens up green space for all the citizens of our asphalt-covered city. We are fabulously wealthy. Let's use our heritage to best advantage rather than waste it.

Thanks for listening.

Anne Symanovich
Oakland Taxpayer, 30 years
Friend of Lake Merritt
415-222-9547

January 18, 2007

Ms. Elois Thornton
City of Oakland CEDA, Planning Department
250 Ogawa Plaza Ste. 3315
Oakland CA 94612

Re: Comments regarding proposed waterfront fence and pylon

Dear Ms. Thornton:

Please consider the following comments regarding the proposed Bay Trial fence and pylon, prototypes of which are on view at Estuary Park.

I am familiar with the environs of the Estuary waterfront, having since 1994 served as president of the Jack London Aquatic Center, at Estuary Park. I write this letter in my capacity as a resident of Oakland, and not on behalf of the Jack London Aquatic Center.

My reactions to both prototypes are extremely negative. I strongly urge the City to reject both.

A. The fence prototype -- too bulky and too "cutesy."

I appreciate that, in a few places along the Bay Trail, the sharp drop-off between the trail-edge and the waters of the Estuary will be so great that pedestrian-safety compels the installation of a fence. It is essential, however, that that such fence *not* be a *wall*. The fence-design should consist of minimalist horizontal lines, so that one can easily see *through* the fence to the water, both up close and from a distance.

I suspect that your designer considers such minimalist design too ordinary, and not artistically challenging. I would counter that the featured attraction on the Bay Trial should be the natural interface of water and shoreline, not a piece of linear public art masquerading as a fence.

The prototype fence is comprised of three layers of overlapping cut-out steel. Its "look" is that of a corset. Its "little-fishy" motif is juvenile, appropriate for a nursery-school, but not for the Estuary. Finally, the fence's primary-blue paint is an unnecessary, overstated reminder that the water beyond the fence is, or should be, blue.

B. The pylon prototype -- a "non-thing."

I fully support the artistic vision of a series of pylons and related installations that will guide pedestrians down the length of the Bay Trial.

The proposed pylon does *not* serve that vision.

The purpose of the trail-map (at the top of one of the pylon's three faces) is presumably to enable pedestrians to fix their location on the Bay Trial. The prototype map fails this purpose utterly.

First, the map includes *no* reference to Lake Merritt Channel, the waterway that connects Lake Merritt to the Estuary. This waterway is one of the most important features of the Estuary waterfront: it is contemporary reminder of what was historically a quarter-mile-wide connection to the slough now known as Lake Merritt; further, the intersection of the Channel with the Estuary is one of the key "X-Y" axes that orients our City geographically and psychologically.

Second, as one looks at the map from Estuary Park, one would believe that the shoreline extending to the southeast is an extended straight line. In fact, that shoreline is comprised of Lake Merritt Channel (noted above) and then the bulge that accommodates the proposed Oak-to-Ninth project. The proposed map simply deletes this major neighborhood from the waterfront.

The *other* two faces of the pylon are startlingly banal. I do not "get" the impressions of flowers and other items that appear on these faces. These impressions have nothing to do with the Estuary, the shoreline or our City. They describe nothing, they evoke nothing, they do not even amuse. At the risk of offending the artist, these faces look like they were acquired wholesale, as excess "monument" inventory. They are silly, without the saving grace of being whimsical.

I am told that the horizontal element (toward the bottom of the pylon) evokes the cross-hatched utility poles that once lined the Embarcadero. I am familiar with those utility poles. The horizontal element does not evoke them.

Finally, allow me share an experience, which initially surprised me. Immediately after my eye registers the physical presence of the pylon, the pylon disappears from my awareness; my eye looks right past the pylon, as if it were not even there. I do not know what combination of structure, color and psychology has created this *non*-impression.

Rather than constituting a Bay Trail punctuation, the pylon is to me a "non-thing." It's not just that the pylon's purpose is unclear; the pylon does not even tickle my curiosity regarding its purpose.

Sincerely,

Robert Kidd
61 Marr Ave., Oakland CA 94612
(T) 510-287-2365

RECEIVED
JAN 12 2007
City of Oakland
Planning & Zoning Division

Elois Thorton, Planner IV
C.E.D.A.
250 Frank Ogawa Plaza, ##3315
Oakland, CA 94612

RE:: case # ER060017 Measure DD project

TREES

The citizens of our city never intended DD to be used to deforest Oakland. It was intended to enhance open space and parkland. Planning Commissioner Michael Lighty suggested having a report on every tree to be removed stating why that particular tree was slated for destruction. It's a good idea, but it doesn't go far enough. If a heritage tree as defined in Oakland's Municipal code is slated for removal,,options from a qualified arborist for preservation and treatment of the tree should first be examined by a citizen's task force. Sick trees can sometimes be treated and recover nicely. trees with structural problems can be helped by careful pruning and sometimes guylines.If the tree is in the way of straight line construction then don't do straight line construction. A curving path through the trees can be beautiful. The park will look more interesting with a mix of old and new trees of different sizes and species. Of course hazardous trees and sick trees that are beyond recovery even with the best of care need to be removed,, and our city needs to find a way tocare for our trees so they don't get to that point due to city negligence.

TRAFFIC

areas where lanes will be omitted should have an experimental period

for a few months where a temporary barrier blocks off the lanes. This trial run will give Oakland empirical data as to how well this will work. The trial run should be well publicized through te usual media and through very large signage on or near the barriers with a number to call if there are serious backups and bottlenecks. Emergency vehicle drivers should be polled on whether they find it a serious problem or not. If things need to be adjusted it will be cheaper and easier if no construction has started and the barriers can be moved or removed.

Digression

On international in East Oakland near the fruivale BART they put up a median strip with hitching posts for horses. This strip has created a traffic bottleneck that was not there before. HAD THEY EXPERIMENTED....

KAISER CONVENTION CENTER

As of now we don't know to what use this beautiful Oakland landmark will be put. It will have more use options with a parking lot than without one. The parking lot and it's magnolias should remain intact at least until a permanent use is decided. then the issue of the parking lot should be revisited. Even if the lot is to be removed the magnolias should stay. THE PARKING LOT WOULD MAKE AN INTERESTING WEEKEND FARMER'S MARKET.

Transportation

There needs to be parking near the park. I'd like to see a whimsically designed, green technology open tram taking people from a single parking lot, perhaps underground, on a circular route around the park with stops at various locations marked by a whimsical tram stop marker. this tram should either be very low cost or free. perhaps it would be good publicity for a company that designs green technology. perhaps such a company might underwrite the cost.

When I was young, as I recall there was a tram that went from the boathouse to Fairyland. The stops were marked by a sign of a life sized toy soldier guard in a striped guardhouse. This was separate from fairyland's "Jolly Trolly" which went from inside fairyland to a picnic area and another toy train that went around the area next to the oakland auditorium. (A large wheel that marked the train station is still there. so this isn't a new idea!) I'm proposing one tram where the route covers the whole lake. the tram itself can be the attraction or it can bring people to various points.

Bicycles

Dacy reminds me that not only do people need bicycle paths, but they also need bicycle racks to lock up their bikes. Having your bike stolen can ruin your day and discourage people from enjoying the park. It seems to me that it would make sense to have drinking fountains nearby.

AERATING FOUNTAINS

could we have one near 14th? or near the twevth street overpass? could someone straighten out the one near the bandstand, which is usually cockywampus? Could you be more specific about what a "goose management" element is? Do I want to know?

EASMENTS

The recent Brown administration has been the most rapacious administration in memory. Although I have high hopes for the Dellums administration to be better, the citizens of Oakland need this effort protected. We don't want to spend all this money and then have the land go for lakefront condominioms built by Perata's cronies.

EASMENTS-continued

To protect oakland citizens from a land grab we deserve a conservation / open space easment on all properties obtained or reclaimed from lanes being reconfigured under DD. No permanent buildings should be allowed unless they pertain to parkland purposes and no structures over one story.((so you could build a bathroom, first aid station or security station) We need a very ironclad easment to protect our money and effort. Where it is appropriate a strict preservation easment should be given to buildings such as the Kaiser Convention Center, The Cameron Stanford house and the 9th Avenue Terminal. And of course the Studio one arts Center. We should not allow these lands to be sold, swapped, leased, traded for political favors or otherwise conveyed at the whim of some future administration.
ALL DD LANDS WHETHER OBTAINED BY DD OR SIMPLY IMPROVED BY OUR MONEY SHOULD BE EASEMENTED.

SECURITY

Bring back the horse patrol!

OBLIGATIONS

When you have an asset like lake merritt and our creeks and waterways you also have an obligation. we need to find a way to keep these thiings nice and clean. Lake merritt is beautiful partly because it is in a beautiful setting with the Oakland hills in the background and some very special landmark buildings around it. the context and setting gives Lake Merritt it's beauty and a sunny sense of space. If we choke it off with a lot of big, ugly, and mostly unaffordable buildings casting shadows and blocking views of the hills and the sunset we are going to wind up with an ugly little puddle. In truth the area around lake merritt is already very densely populated. The lake needs room to breathe so we all can breathe there. In the Lakeside Apartments neighborhood, where

I live, we have been inundated with development which has greatly diminished our quality of life. Personally I think this project is worth doing IF it is done correctly and not as another rapacious game. I ask that you be cognizant that this is a residential neighborhood which has sufferred from the cumulation of several projects and draw your attention to CEQA 15300.2 (b), Which speaks to cumulative impact. Please try to find a way to minimize the impacts of this project on a densely populated, residential neighborhood which has sufferred more than it's share of construction and it's accompanying mess, noise, and inconvienience from a city that is out of control. The quietest possible technologies should be used and we really don't like to start our day with the loud, incessant noises of construction. we need to work out hour and days so we can have the "quiet enjoyment of our homes", which is by the way our legal right by state law. I think this project is worth doing for all of Oakland but find a way to be courteous.

Sincerely,

Orna Sasson

Orna Sasson
L.A.N.A.
1428 Jackson St
Oakland, CA 94612

P.S. I would like to point out that DD was voted on by the citizens of Oakland. It is something we decided and is NOT being forced on us. If it is enacted in the spirit we voted on it for, I am proud of my city.

Thornton, Elois A

From: Philip Dow [pdow@mindspring.com]
Sent: Sunday, January 07, 2007 9:59 AM
To: Elois A. Thornton
Subject: Meassure DD EIR

Dear Ms. Thornton,
I intended to get the attached letter in the mail Friday but got bogged down with business issues. I hope the Word attachment work for meeting the deadline. I'll put a hardcopy in the snail-mail Monday morning.
Thanks,
Philip Dow

Oak Knoll Coalition
Generating citywide support to create long-term benefits at Oak Knoll
P.O Box 5733, Oakland, CA 94605

HEIA
OKNIA
Sequoyah Heights
Sequoyah Highlands
Sequoyah Hills
SHOKNA

January 5, 2007

Elois A. Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Case File Number: ER06-0017

Dear Ms. Thornton,

The Oak Knoll Coalition has asked me to communicate our interests and concerns regarding the Measure DD impacts on future creek improvements.

As you may be aware, SunCal, the owners of the former Oak Knoll Naval Hospital, are in the process of creating a development plan for that site. One element that has the community very excited is daylighting Rifle Range Creek, half of which is currently culverted and the rest seriously neglected. The plan calls for creating a restored riparian watercourse through the entire property.

The plan also calls for establishing hiking trails that follow the creek and connect to the East Bay Regional Park's Leona Canyon and to Mountain Boulevard, which would lead to the Oakland Zoo and State Arboretum. Thus, the restored creek will become an environment that can be experienced by all residents of Oakland.

While not organized yet, there seems to be considerable interest in establishing a neighborhood volunteer network that would focus on Rifle Range Creek to provide maintenance support once the restoration is complete.

Therefore, we request that the EIR review the ways in which Measure DD funds can assist in restoration and maintenance of Rifle Range Creek.

Sincerely,

Philip Dow
President

Thornton, Elois A

From: James Zahradka [jzahradka@excite.com]
Sent: Sunday, January 07, 2007 10:35 AM
To: eathornton@oaklandnet.com; wwlassowsky@oaklandnet.com; nnadel@oaklandnet.com; jmpeter@oaklandnet.com
Cc: lourdesoakland@aol.com
Subject: ER 06-0017; Our Lady of Lourdes Catholic Church comments re Measure D EIR

Our Lady of Lourdes Catholic Church would like to comment on one aspect of the Measure DD projects; namely, the planned removal of the pedestrian crosswalk across Lakeshore Avenue nearest to the entrance to our church. We oppose this removal.

This crosswalk is important for the safety of our parisioners, parish staff, and others who use Our Lady of Lourdes's facilites. Every weekend we welcome more than 700 people to our three Masses; that number increases severalfold for major holidays such as Easter and Christmas. Further, dozens of people join us to celebrate daily Mass. Many of our parishioners are elderly--some wheelchair-bound--or families with young children. Many of these people walk to Mass and utilize the currently-existing crosswalk. Their safety is of paramount importance to us.

Our Lady of Lourdes has also been home to several educational institutions, including our own elementary school, the University of San Francisco's East Bay campus, and St. Paul's Episcopal School. Students from all of these schools used the crosswalk extensively; in particular, the St. Paul's students used it to access Lakeside Park for their lunch and recess activities.

Starting with the next academic year, we plan to rent the school facility to the Bay Area Educational Institute, a high school for students with learning disabilities. They likely plan to use the crosswalk in a similar fashion to St. Paul's.

Finally, I would note that the parish has not been consulted prior to the decision to remove the crosswalk. It was only because an alert parisioner noticed, when reviewing a diagram of the proposed changes to Lakeshore, that the crosswalk was not part of the plan that we were made aware of this proposed significant change.

In short, the existence of the crosswalk is critical to the safety of the hundreds of parisioners, students, and parish and school staff associated with the parish and its lessee. We urge you not to remove it.

Thank you for your consideration.

Sincerely yours,

James Zahradka
President
Our Lady of Lourdes Catholic Church Pastoral Council

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Thornton, Elois A

From: JOHN BOWERS [jbowers45@msn.com]
Sent: Friday, January 05, 2007 11:48 AM
To: eathornton@oaklandnet.com
Subject: Measure DD NOP

ggas.DD.deir.doc (32 KB)

Dear Mr. Thornton:

In the NOP comment letter I sent you yesterday (attached), I inadvertently neglected to refererence one of the principal factors that substantiates the environmental sensitivity and uniqueness of the Lake Merritt Channel (LMC), and that is the fact that, as documented in the City's OSCAR element, the LMC is inhabited by the Barrow's goldeneye, a migratory duck that is also a specie of special concern under the Cal. Endangered Species Act.

Thank you for your consideration of this additional item of information.

John Bowers

January 4, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR Notice of Preparation

Dear Mr. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Notice of Preparation (NOP). The GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly the GGAS is in general strongly supportive of the projects described in the NOP.

However certain aspects of the Measure DD projects pose clear risks to the habitat and natural resource values of the Lake Merritt Channel (LMC) in particular. Because of its constrained size the LMC is more sensitive to disturbance from human activity than is the lake itself. The DEIR needs to carefully evaluate these risks and to develop appropriate mitigation measures to avoid or minimize them.

The risks in question are the following:

1. **CONSTRUCTION-RELATED IMPACTS FROM 10TH AND 12TH ST. RECONSTRUCTION PROJECTS.**

The 10th and 12th St. reconstruction projects will be carried out directly in and adjacent to the LMC. They will involve substantial amounts of highly disruptive activity in the form of demolition, excavation, and grading. The noise and percussive effects from these projects will have a clear and indisputable adverse impact on the natural resource and habitat values of the LMC. During the periods when construction activities are occurring these impacts will in significant portions of the

LMC prohibit migratory and other waterfowl that would otherwise be expected to use the LMC for foraging and resting from doing so.

It is of critical importance that the DEIR acknowledge these impacts and analyze appropriate mitigation measure to reduce if not eliminate them to the maximum extent possible. Such measures should include at minimum confining to the non-migratory waterfowl season of April – September at least those construction activities likely to cause the greatest disturbance to the LMC's habitat values.[1]

2. IMPACTS FROM OPENING THE LMC TO RECREATIONAL SMALL BOAT PASSAGE.

The regionally significant natural resource and habitat values that the LMC currently supports can be attributed in no small part to the fact that it is and has been for decades closed to boat traffic. A recent study performed for the City of Berkeley to assist it in planning for its Aquatic Park documents the disturbance that boating and other human activity can cause to foraging and resting ducks and other birds. The Measure DD projects will open the LMC to small boat passage for the first time in perhaps over a century.

It is critically important that the DEIR evaluate the potential for boat traffic to degrade the high quality waterfowl habitat that the LMC currently supports. It is equally important for the DEIR to evaluate measures to reduce such impact to the absolute minimum. Such measure should include 1) a ban on all motorized boat traffic, and 2) a seasonal closure of the LMC to boat traffic to coincide with the closure of the Trestle Glen arm of Lake Merritt to recreational boating (Nov. 1 – Apr. 1).

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers
Member, East Bay Conservation Committee

[1] As is evidenced by the seasonal restrictions to protect fish habitat on construction activity associated with the new SF Bay Bridge project, such seasonal restrictions are not uncommon.

Thornton, Elois A

From: JOHN BOWERS [jbowers45@msn.com]
Sent: Friday, January 05, 2007 2:06 PM
To: eathornton@oaklandnet.com
Cc: jmpeter@oaklandnet.com
Subject: Measure DD NOP

Aquatic_20Park-finalrpt-V31 1 ...

Dear Mr. Thornton:

I apologize for the duplicate posting earlier today.

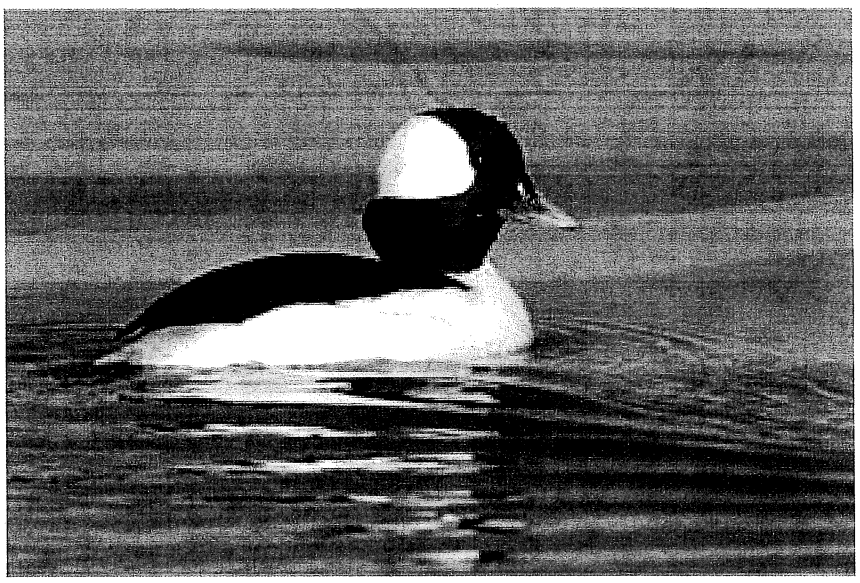
In my NOP comment letter I referred to a bird disturbance study performed for the City of Berkeley. The study is entitled "Aquatic Park, Berkeley, CA: Waterbird Population and Disturbance Response Study (2004)," prepared by Avocet Research Associates of Pt. Reyes Station, CA. An electronic copy of this study is attached hereto. Please incorporate this study in my comments.

Thank you. John Bowers

Aquatic Park, Berkeley, California:

Waterbird Population and Disturbance Response Study

2004



A report prepared for the City of Berkeley

by

Avocet Research Associates
65 Third Street, Suite 25
Point Reyes Station, CA 94956

May 12, 2005

Executive Summary

We conducted 22 waterbird surveys of Aquatic Park during 2004 to determine use patterns, species richness, and waterbird abundances at the site. Additionally, we conducted six disturbance trials during the winter months to estimate flush distances of waterbirds in response to non-motorized watercraft.

Approximately 80 percent of the waterbirds using the lagoon occur during winter months; summer numbers of birds comprised about 20 percent of total abundance. Waterbird numbers swell from October through March almost entirely due to the arrival of rafting waterbirds, especially bufflehead, American coot, and scaup. These three species represented 40 percent of the total waterbirds using the site and comprised the bulk of the rafting waterbird population, as well as the preponderance (72.7 %) of disturbance responses. The greatest numbers of waterbirds were present in the lagoon during winter storm events. Winter months also supported the greatest number of species.

Grouped by class (diving birds, dabbling ducks, waders, and gulls) diving birds comprised more than 50 percent of the waterbird community. Waders are most abundant during migratory periods in late spring and early fall. Dabblers (mallards) breed at the site and are the most abundant waterfowl in June. Gulls account for only a small proportion (~6%) of the total. Several species of long-legged waders (egrets and herons) roost in trees along the shoreline throughout the year.

In general, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon. There may be some movement out of the lagoon if birds are disturbed or if prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary. No movement of waterbirds out of the lagoon due to disturbance was observed in this study.

The winter waterbird community was distributed evenly around the lagoon, but tended to occur in greater numbers in the widest areas in the central and southern half of the lagoon where more habitat was available. Densities of rafting waterbirds did not differ significantly among circulation cells.

Average flush distances (31-36 meters) were similar among three classes—divers, dabblers, and waders. The closest distance at which birds will not flush 95 percent of the time (upper 95% quantile of standard normal flush distance), was calculated as 63-70 meters. The narrow configuration of the lagoon does not afford great opportunity to avoid disturbance to rafting waterfowl, however recommendations to restrict boats to a central lane (~20-m) and to increase vegetative cover along the shoreline should reduce current and future disturbance levels to waterbirds.

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1.0 Scope and purpose of study

The purpose of this study was three-fold:

- to document waterbird use of the Main Lagoon;
- to evaluate disturbance parameters of the waterbird population, and;
- to develop recommendations to minimize disturbance to waterbirds.

To address these goals Avocet Research Associates conducted 22 surveys of rafting waterbirds and shorebirds for one year (January 2004 – December 2004) within and along the shore of the Main Lagoon. The survey data is intended to help identify areas of high waterbird use, develop management guidelines for boating activities, and provide baseline data for future periodic evaluations of the effects of boating on the rafting and foraging waterbirds. Independent disturbance trials were conducted to quantify responses (minimum flush distances) to disturbance by non-motorized watercraft.

2.0 Site description

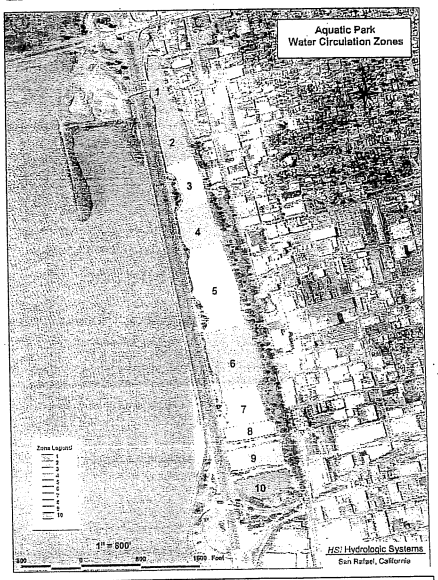
Aquatic Park encompasses 64.8 acres of waterbird habitat in three distinct water bodies: the Main Lagoon (56 acres); the Model Yacht Basin (4.9 acres), and the Radio Tower Pond (3.9 acres). These impoundments were constructed in 1930 and receive muted tidal influence through several culverts that communicate directly to San Francisco Bay (SFB). This study focused on the Main Lagoon, a relatively shallow (<8 feet deep), linear (60-180 meters wide x 1.4 km long) waterbody with unnaturally steep slopes along the shoreline. Although SFB has a tidal range of approximately six feet between mean higher high water and mean lower low water, the tidal range in the main lagoon of Aquatic Park is only 1.4 feet (NRMS, 2003). The tidal range of the Model Yacht Basin is less than one foot. The lagoon is subject to tidal pumping, that is, the tide does not rise and fall in synchrony with the SFB tides, rather there is a lag period and the resident time of tidal water in the lagoon is longer than in unrestricted bay waters. As a result of this muted tidal influence, there is relatively little tidal flat (shorebird) habitat, but open water habitat is consistently available. The NRMS determined that there is stratification of the lagoon in the summer months, but concluded that it is "unlikely that stratification occurs regularly" (p. 34) and therefore does not create severe or persistent anoxic conditions in the water column, a condition that, if persistent, would have a negative effect on waterfowl. In the Main Lagoon water circulation is poorest in the north and south portions. An

earlier study partitioned the lagoon into circulation cells based on the degree of tidal exchange (Figure 1).

Several wetland habitat types are associated with Aquatic Park, however the preponderance of area is characterized as saline open water. Salt marsh, tidal flats, and freshwater marsh are extremely limited in size and structure and provide almost no habitat for characteristic bird species of these respective habitat types. The openness of the shoreline, particularly on the eastern shore that is traversed by a footpath, limits the value of the shoreline as avian habitat. The absence of any barrier or vegetative buffer between the footpath and the shoreline reduces the value of the open water habitat to waterbirds to an unknown degree.

Both the shoreline and the open water are subject to intense and continuous levels of human uses and impacts. The Highway 580 corridor that parallels the lagoon to the west is one of the busiest thoroughfares in the San Francisco Bay area, perhaps in the country. The railroad tracks parallel the lagoon to the east, and these too introduce a consistent and loud source of disturbance to wildlife. Air traffic (commercial airliners accessing Oakland International Airport, helicopters, etc.) is also frequent. Park users along the shoreline participate in a wide variety of activities that create ongoing sources of disturbance to wildlife—running, biking, dog-walking, frisbee, etc. The open water is popular for watercraft especially kayaks and rowing skulls. Waterskiing is permitted in the summer months. Watercraft (specially kayaks and rowing shells) access the lagoon at all times of year and probably introduces the most consistent source of disturbance to waterbirds, especially rafting waterfowl.

Figure 1. Aquatic Park: circulation zones



FROM: AQUATIC PARK NATURAL RESOURCE MANAGEMENT PLAN, 2003

3.0 Definition of Terms

Several terms used in reference to waterbirds require definition.

"Divers" refers mostly to waterfowl, but also includes several other taxonomically distinct species (grebes, cormorants, terns) that generally forage beneath the surface of the water or dive for their food. Scaup (Plate 1) are typical divers; we have included the American coot (Plate 2) in this general category because of its behavior and abundance at the site.

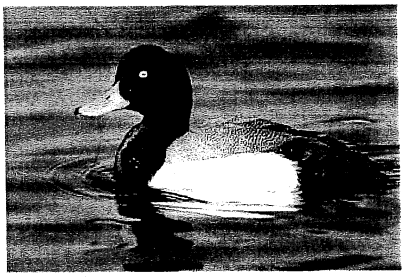


Plate 1. Greater scaup, one of the most abundant species at the site, is a typical "diver."

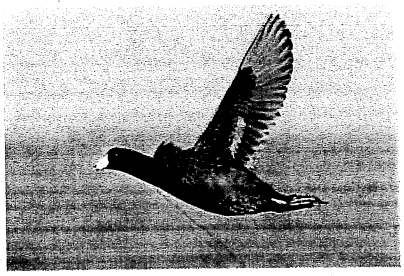


Plate 2. American coot, a member of the *Rallidae* family, is common at Aquatic Park. Its primary foraging methods are diving in shallow water and dabbling near the surface (Taylor 1998). At Aquatic Park it tends to consort with diving ducks.

"Dabblers" refers to surface feeding ducks; they strain algae and other vegetation from the surface, or sometimes "tip-up" to grovel on the bottom for vegetation or benthic infauna (invertebrates).

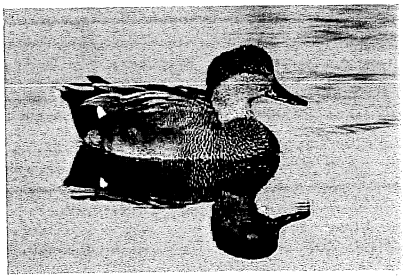


Plate 3. Gadwall, the classic "dabbling" duck, habituates shallow water and feeds at the surface or even on exposed mudflats or grassy shorelines.

"Waders" encompasses a variety of species from various families, all of which forage in shallow water or along shorelines. Waders include "Ardeiids" (egrets, herons, night-herons) and shorebirds (sandpipers, dunlins, dowitchers, etc.).

"Gulls" are separated into their own group because they are opportunists and engage in a variety of feeding strategies. They respond differently to disturbance than any of the other groups, often moving toward, rather than away from, human activity. Terns are often included with the gulls because of a close taxonomic relationship, however here we have grouped the terns with the divers because of their foraging behavior and potential sensitivity to disturbance.

"Species of special concern" is a catchall phrase that includes any species identified by either state (California Department of Fish and Game) or federal (U.S. Fish and Wildlife Service) agencies that require special consideration because of ongoing threats to their populations. This list is continually updated and modified. A list of special status species recorded at Aquatic Park and references to those documents that identify their status is provided in Appendix B.

"Independence" of data or observations means that one sample (or observation) has no influence on the other. Non-independence indicates a cause-and-effect relationship. For example, bufflehead counted in one section of the lagoon may be avoiding gulls in another section, therefore the count data from each section are considered non-independent.

4.0 Methods

Waterbird censuses

ARA biologists conducted 22 comprehensive censuses of the Main Lagoon at Aquatic Park, Berkeley, California at approximate two-week intervals from January through December, 2004 to document total numbers of waterbirds using the lagoon during that period. Each census comprised at least one "absolute count" (Bibby *et al.* 2000) of all birds on the lagoon and shoreline. Because waterbirds may utilize the lagoon differently under different environmental conditions, censuses were scheduled to capture a range of tidal influences and weather conditions (Table 1). The surveys included open water and shoreline habitat as well as vegetated areas adjacent to the lagoon that may have been utilized by waterbirds for roosting.

One to two biologists counted the birds present during a complete tidal cycle on each census. Counts were made from fixed points along the lagoon's shoreline. Birds were identified to species, and each individual or flock was assigned to one of eight "circulation zones" within the lagoon (Figure 1) as delineated by the Aquatic Park Natural Resource Management Plan (NRMP 2003).

To avoid over-counting or under-counting, on approximately one-half of the visits (n=12) a survey consisted of three separate counts: (1) a preliminary overall estimate of the total number of individuals of each species on the lagoon; (2) a sectional count in which each bird was assigned to one of ten circulation cells, eight in the main lagoon, one in the model yacht basin (MYB), and one in the radio-tower pond (RTP); and, (3) a final overall estimate of the total number of individuals of each species on the lagoon. These more comprehensive surveys allowed us to determine if there was significant change in waterbird numbers over the course of a given census period. On the remaining surveys the methods conformed to #2 above, i.e., all birds were assigned to sections but no overall estimate was made; the sectional counts were grouped and totaled post hoc.

If discrepancies were detected between overall estimates and recorded numbers, recounts of selected common species were made. Additionally, movements of individuals or flocks in-and-out of the lagoon, if apparent, were noted and reconciled with overall numbers. Notes on obvious sources of disturbance were also noted. The behavior of each individual or flock was noted on the data entry sheet— roosting, foraging, or flying.

Species were expected to move among various segments of the lagoon, however we assumed that cumulative sightings over the course of the surveys would give an indication of which species occurred in which areas most frequently, thereby providing useful information for developing a plan to help avoid or minimize impacts to sensitive species.

Total observation time was 86 hours (Table 1); the average survey took 3-4 hours to complete. (Some surveys were expanded to cover the entire tidal cycle of 6-hrs, but due to the muted tidal influence in the lagoon it soon became obvious that, other than waders, the waterfowl at Aquatic Park were not responding to tidal levels on San Francisco Bay.)

Table 1. Dates, times and conditions of waterbird surveys conducted at Aquatic Park.

Census #	Date	start	end	mins	Tide	sky	temp °F	wind (kph)	wind dir	boats	spec. cir
1	1/29/04	1515	1645	90	low	ovc	53	3	W	Y	
2	2/4/04	1240	1440	120	high	ovc	56	0-2	NW	N	
3	2/11/04	0701	1147	286	low	clear	42	0-1	E	Y	
4	2/17/04	0659	1034	215	high	ovc	62	2-13	S	N	storm
5	2/25/04	0715	~1448	393	low	ovc	54	8-12	S	N	storm
6	3/11/04	1449	1725	156	high	clear	58	5-7	NW	Y	
7	3/31/04	1315	1820	245	low	65%	57	4-8	W	N	
8	4/14/04	1400	1845	285	high	clear	68	6-7.5	NW	Y	
9	4/23/04	1530	1745	135	high	clear	61	0	na	Y	
10	5/7/04	0733	1037	184	low	50%	65	1-2	S	N	
11	6/9/04	1000	1415	255	low	clear	61	7-10	W	N	
12	7/26/04	0805	1250	285	low-high	ovc	62	2-5	W	Y	
13	8/20/04	0730	1130	240	low	ovc	62	3-5	WSW	N	
14	9/8/04	0810	1225	195	low-high	clear	73	1-3	SW	Y	
15	9/29/04	1200	1610	250	high	ovc	58	1-5	SW	Y*	
16	10/20/04	1030	1445	255	high-low	ovc	59	2-8	W	N	
17	10/28/04	1040	1445	245	high-high	ovc	55	4-6	S	Y	
18	11/12/04	0800	1220	260	high-high	ovc	55	5-8	NW	Y	
19	11/17/04	1000	1400	240	high	clear	65	0-2	W	Y	
20	11/30/04	1440	1715	155	low	40%	52	4-7	N	Y	
21	12/8/04	1345	1625	160	low	ovc	57	5-6	S	N	
22	12/22/04	0740	1230	290	high	20%	52	0	na	Y	
23	2/15/05	1015	~1500	225	low	rain	62	0	na	N	storm

* 3 people working on waterski island
Boats present: 13xs
Boats absent: 10xs

Disturbance trials

Six disturbance trails were conducted between November 15, 2004 and February 15, 2005. The trials were independent of the waterbird surveys. They were conducted on different dates, and were performed when no other watercraft were present on the main lagoon. On each trial a single observer paddled a 21' red, single-person kayak from the dock in Section 7 (Figure 1) northward in the center of the lagoon until the middle of Section 1 was reached, approximately 50-m from the northern shoreline. To assure independence of disturbance events, the observer then waited for 30-minutes before paddling southward along either the eastern or western

shore, back to the dock. Each transect was approximately 1.2 km in length, therefore each trial covered about 2.4 km, or a total of 14.4 km over six trials.

The observer recorded disturbance distance from each species of waterbird that moved away from the craft. Disturbance was defined as the moment at which a bird or flock moved away from the kayak, either by swimming, flying, or diving. The distance to the closest bird in a flock was measured using a laser digital range finder (KVH data scope) and recorded on a portable tape recorder. The data was transcribed to data sheets *post hoc*. "Head alert" behavior is sometimes used as an indication of preliminary disturbance (Burger 1991, Rogers and Smith. 1997). We did not record head alerts because it proved impossible to determine whether the source of the alert response was the kayak or some other stimulus (passing train, dog on the shore, aggression by other birds, etc.). Head alerts were noted as a response of birds farther away from the disturbance source than those that swam, flew, or dived.

Data analysis

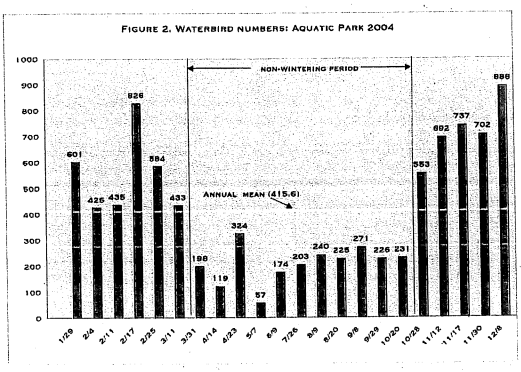
The high degree of site tenacity in wintering waterbirds (Kelly and Cogswell 1979, Evans and Pienkowski 1984, Warnock and Takekawa 1995) results in potentially high correlations between censuses conducted at the same location (Stenzel *et al.* 2002). The inherent non-independence of the data (i.e. presence on one count may predicate presence on another) and the relatively small sample size of this study site placed limits on the validity of significance tests applied to this data set. Nevertheless, strong patterns or differences indicated by the statistical analysis provide a suitable means for evaluating waterbird use of the site. To facilitate comparisons among count areas (sections) of different sizes, and to compare to known values at other Bay Area locations, species abundances were summed, converted into densities (birds/ha), and log-transformed for both species and species groups. Mean abundance values were used to document habitat values and to characterize the waterbird community. Analysis of variance was used whenever the census data met the associated assumptions of analysis to test hypotheses regarding waterbird abundances. Measures of biodiversity—species richness and density values—were calculated for comparison with the few other sites around the bay area for which data are available.

To test the hypothesis that there was a change in waterbird abundance during a given survey period (~4 hrs), we performed a t-test for matched pairs on population estimates made at the start (Survey A) and finish (Survey B) of each of 13 surveys (Survey #s 6-18).

5.0 Results of Waterbird surveys

Seasonal occurrence

Numerous studies have documented the general pattern of seasonal occurrence of waterbirds in the Greater San Francisco Bay area (e.g. Shuford et al. 1989, Takekawa *et al.* 2000, 2001, Kelly and Tappen 1998). The pattern of winter abundance and summer scarcity was mirrored at Aquatic Park (Figure 2). Total numbers of waterbird detections (n=9927) on all censuses (n=22) are graphed in **Figure 2**, below.



The surveys were completed over the course a calendar year, therefore winter numbers (those above the annual mean) represent two different winter seasons, the end of winter 2003-04 and the beginning of winter 2004-05. Although interannual variation in waterbird numbers is to be

expected (Shuford *et al.* 1989, Kelly and Tappen 1998), the generalized winter abundance pattern can be seen in those census results that lie above the annual mean (Figure 2).

During 2004, the arrival of wintering birds occurred rather abruptly. During the two-week period, October 28-November 17, the waterbird population increased three-fold. This increase was accounted for almost entirely by the arrival of bufflehead on November 11 and the arrival of scaup on November 17, a pattern of arrival to be expected most years. However, it is important to note that arrival dates also vary interannually, depending on far-ranging influences such as weather in more northerly latitudes. The build-up in scaup numbers can begin in late-September or early-October; nevertheless, the dates observed in this study mirror a fairly typical Bay Area pattern. Both scaup and bufflehead may depart sites like Aquatic Park unexpectedly during periods of episodic prey abundance on the open bay, most characteristically the herring spawn (Shuford *et al.* 1989). Such local movements may account for the dip in winter numbers on February 4 and 11 (Figure 2).

Like arrival dates, departure dates may vary by a week or two annually. However departure tends to occur more gradually than arrival. In 2004, departure occurred between the March 11 and March 31 surveys, a fairly typical pattern. The two surveys conducted during storm events (February 17 and December 8) also documented the highest number of waterbirds on the lagoon. During those storm surveys, numbers of scaup, coot, bufflehead, and goldeneye peaked (comprising 65% of the total), an indication that Aquatic Park provides refuge for rafting waterbirds when the open water of San Francisco Bay is roiled by winter storms.

To summarize seasonal occurrence: numbers of waterbirds at Aquatic Park swell from October through March almost entirely due to the arrival of rafting waterbirds, also known as "divers." There may be some movement out of the lagoon as prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary. Highest numbers of waterbirds are present in the lagoon during winter storm events.

Movement of waterbirds

We considered the possibility of movement in-and-out of the study area during census periods. If large numbers of birds had entered or left the lagoon during the course of a given survey, either due to disturbance or some daily pattern, it might have biased our findings.

Our analysis found a slight but significant difference between the "before-and after" estimates. On average, numbers declined through each survey period (t_{12}=1.99; P<0.05). However, significance of this decline depended on the departure of one large shorebird flock during census #9. After omitting that census from the analysis, we found no significant evidence of a change in waterbird abundance within survey periods (t_{11}=1.55; P=0.10)

Therefore, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon, a conclusion that agreed with our general impression and was supported by a lack of observations of any large-scale movement. This sedentary tendency is breached during periods of high migratory *zeitgeist*, however. Our anecdotal observations do suggest that the one group that may "commute" more readily from the lagoon to other sites is the gulls, primarily ring-billed gulls. Gulls accounted for only 6 percent of the waterbird abundance, however, and their response to disturbance is not of major concern of this study which is concerned primarily with rafting waterbirds and flocking shorebirds. Although gulls may depart more readily from the lagoon, such departure may not be related to disturbance.

Variance within and between three surveys.

Next, we investigated whether the abundance estimate derived from the sectional surveys differed significantly from the "before-and-after" population estimates. A test of the homogeneity of variance (variance is the square of the standard deviation, used to measure similarity of variation among samples) among the three surveys conducted on each of 12 dates determined that the variances were homogeneous ($F_{9,11}$ = 1.3723; P>0.05) and therefore ANOVA was appropriate. (Again, we eliminated the April outlier survey.) We found no difference among the three consecutive surveys ($F_{2,33}$=0.702; P>0.05). This suggests that there was no significant movement of birds into or out of the lagoon during each census period.

Seasonal abundance

The winter numbers comprised approximately 80 percent of the total detections of waterbirds using the lagoon over the course of the year. Summer numbers of birds comprised about 20 percent of the annual waterbird abundance (Table 2).

Table 2. Waterbird abundance of waterbirds at Aquatic Park, 2004.

Season	n	Mean	se	min-max
Winter (Nov-Mar)	11	617.8	±44.4	425-888
Summer (Apr-Oct)	11	194.4	±19.2	57-271
Overall (Jan-Dec)	22	415.6	±52.4	57-888

Approximately 90 percent of waterbirds were represented by 15 species. Three species—bufflehead, scaup, and coot— represented 40 percent of the total annual abundance; all three were classified as "divers." These three species comprised the bulk of the rafting waterbird community, as well as the preponderance (72.7 %) of disturbance responses. The winter waterbird community was widely distributed around the lagoon, but tended to concentrate in the widest areas in the central and southern half of the lagoon (see "Distribution among sections," below).

The summer population was comprised of a potpourrie of species, about half (51.7%) of which included locally-breeding waterbirds, in order of abundance: mallard (including domesticated ducks), American coot, Ardeiids (herons, egrets, and night-herons) and Forster's tern. In the late summer months a varying array of early migrant shorebirds visited the site, apparently sporadically; their numbers account for 17.8 percent of summer records. Numbers of several of those non-breeding species can be impressive. A high count of 32 snowy egrets and of 86 Forster's terns on August 9, 2004 probably represented use by post-breeding individuals from nearby nesting colonies. The annual high counts of double-crested cormorants occurred on August 9 (44) and September 29 (49), another species that nests in Central San Francisco Bay and apparently uses Aquatic Park as a post-breeding roosting and foraging site. Additionally, a small roosting colony of black-crowned night herons persisted through the summer months; they tended to use the cypress trees on the western shore (Sections 3-5), or the willows in the northeast corner of the RTP (Section 10). Several of the aforementioned species are "Special Concern Species;" their status is discussed in Appendix B.

Deviations from the general seasonal pattern: anomalous surveys

Four of the 22 surveys represented in Figure 2 show apparent anomalous patterns above or below the generalized trend. Proximate causes of those deviations from the norm are explained, as follows:

2/11/04: A dip in the total number of waterbirds on the lagoon was due to the absence of one common species (scaup) that is usually present in winter. The absence of scaup indicates that the local flock may move off site in unison, perhaps in response to a disturbance event on the lagoon or to the availability of some prey source in San Francisco Bay. Scaup tend to congregate in uniform flocks and respond to disturbance and/or foraging opportunities *en masse*.

4/23/04: The late April peak in numbers of birds (Figure 2) resulted from a single flock of 300 shorebirds (mostly western sandpipers and dowitchers) that was roosting along the western shoreline in Sections 6 & 7. This timing corresponds to the peak of shorebird migration through the area and indicates that the west shore of the lagoon does provide a viable roosting site for shorebirds during migratory periods.

2/17/04 and 12/08/04. These two "storm surveys" also accounted for the highest numbers of waterbirds on the lagoon. This correspondence indicates that the lagoon has some value as refuge during storm events, most likely for birds moving in from the South and North basins, the two closest open water habitats on San Francisco Bay.

Species richness

Species richness is simply the number of species using a site. It is a commonly used measure of biodiversity, and provides a useful baseline for future comparison. A total of 50 waterbird species were documented at Aquatic Park during 2004. Additionally, two domestic hybrids were present year-round. A list of all species detected is provided in Appendix A.

The total number of species recorded on a given census is presented graphically in Figure 4. The pattern is similar of that to that of waterbird abundance represented in Figure 2, that is, greatest diversity of species in the winter months and lowest diversity of species in the summer. The peak number of species occurs in mid-winter (December and January) and the nadir is reached in early summer (May-June). This is the pattern of waterbird abundance typical of the region; during the summer months many of these species breed in more northerly areas, or at wetlands in the interior of the continent.

FIGURE 3. WATERBIRD ABUNDANCE LOG-TRANSFORMED

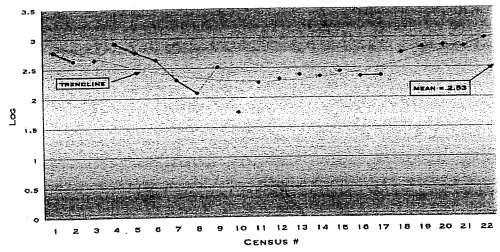
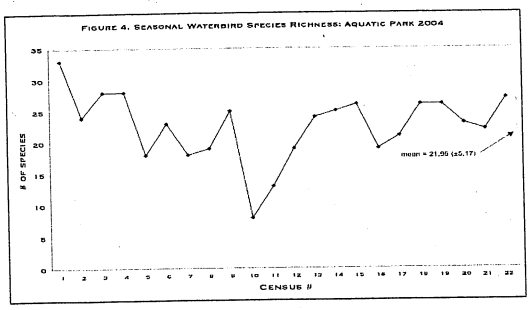


FIGURE 4. SEASONAL WATERBIRD SPECIES RICHNESS: AQUATIC PARK 2004



Bird groups ("guilds") based on foraging behaviour and ecological affinities

For the purposes of data analysis and interpretation, the birds of Aquatic Park were pooled into four broad categories: divers, dabblers, waders (shorebirds and *Ardeids*) and gulls. In addition, several similar species (congeners) were lumped into a single group because of the difficulty of separating them in the field. Therefore, lesser scaup and greater scaup were considered "scaup" and short-billed and long-billed dowitchers were considered "dowitchers." Likewise, small shorebirds of the genus *Calidris* (dunlin, western and least sandpipers) were considered "peeps." Terns are often lumped with "gulls," however their ecological niche is more akin to the divers. These classes are convenient for the purposes of this study, but some species (e.g. Canada goose), do not fit easily into any category.

Grouped by class, diving ducks comprised over half (56.1%) of the mean annual abundance of waterbirds and about 60 percent of the mean winter abundance. Waders are most abundant during migratory periods in late spring and early fall; on an annual basis, they accounted for 27.25 percent of all observations. Dabblers (mallards) breed at Aquatic Park and are the most abundant waterfowl in summer; overall, they accounted for 10.3 % of the waterbirds observed. Gulls account for only 6.3 percent overall (Figure 5).

Figure 5. Waterbird groups at Aquatic Park, 2004

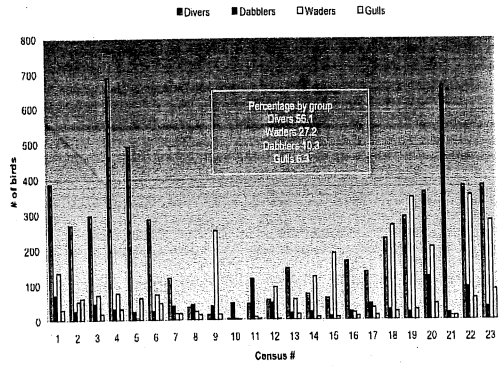


Table 3. Species or species groups that accounted for at least one percent of the total observations are ranked by mean abundances followed by minimum-maximum numbers, and percentage of overall detections.

#	Species	Class	mean ±se	Min-max	Percent (± se)
1	Bufflehead	Diver	114.4 (±17.1)	2-213	14.6 (± 2.4)
2	Dowitcher species (2)	Wader	96.3 (±19.1)	16-170	8.2 (±2.6)
3	American Coot*	Diver*	80.9 (±8.6)	2-138	15.3 (±2.4)
4	Scaup species (2)	Diver	75.9 (±29,7)	2-276	5.8 (±3.6)
5	"Peep" (3 species)	Wader	78.7 (±14.4)	29-142	7.4 (±3.7)
6	Common Goldeneye	Diver	44.6 (± 2.3)	5-91	5.6 (±1.1)
7	Mallard	Dabbler	32.3 (± 5.1)	2-109	7.8 (±2.8)
8	Ring-billed Gull	Gull	26.2 (±5.3)	1-84	5.5 (±1.0)
9	American Avocet	Wader	22.3 (±3.7)	2-42	3.1 (±0.8)
10	Pied-billed Grebe	Diver	16.1 (±1.9)	2-33	3.1 (±0.5)
11	Double-crested Cormorant	Diver	15.8 (±3.6)	1-49	3.0 (±1.4)
12	Forster's Tern	Diver	15.4 (±5.3)	4-89	2.6 (±1.8)
13	Red-breasted Merganser	Diver	11.8 (± 3.7)	1-39	1.1 (±0.5)
14	Snowy Egret	Wader	11.5 (±1.9)	1-32	2.4 (±0.9)
15	Canada Goose	Dabbler	10.6 (±5.9)	1-87	1.6 (±0.6)
16	Ruddy Duck	Diver	9.7 (±4.4)	1-42	1.0 (±0.7)
17	Black-necked Stilt	Wader	6.0 (±3.4)	3-17	1.0 (±0.3)
18	Domestic Mallard	Dabbler	5.2 (±0.7)	1-12	1.0 (±0.4)

*Am. Coot may be classified as either diver or dabbler (Taylor 1998).

The eighteen most common species at Aquatic Park account, on average, for 93.17 (±0.99) percent of the total number of birds using the site. In winter, these dominant species accounted for 95.65 (±0.47) of all detections; in summer for 88.83 (±1.77) percent of all detections.

Other species occur in very small numbers (e.g. hooded merganser), or as single individuals (e.g. green heron). Densities of the most common species are comparable to values at those few other SFB area wetlands for which data is available.

Table 4. Mean winter density (birds/hectare) of the most abundant waterbirds at Aquatic Park compared with other sites. Last row compares overall densities with baywide densities.

Species	Mean (±se)	peak	SFB[1]	SFB[2]	SFB[3]	SFB[4]	OC[5]
Bufflehead	5.1 (±0.8)	9.4	0.9 (6.6)	—	—	—	5.5
Dowitcher	4.3 (±0.9)	7.5	~5.5	—	—	—	—
American Coot	3.6 (±0.4)	6.1	0.57	—	—	—	10.2
Scaup	3.3 (±1.4)	12.2	3.9 (15.4)	8.9	—	—	2.2
Overall	18.3	—	5.0	—	5.0	9.1	—

[1] Goals Project 2000
[2] **Stenzel et al. 2000**
[3] Takekawa et al. 2001 (baylands)
[4] Takekawa et al. 2001 (saltponds)
[5] OC=outer coast; Kelly and Tappen 1998

Limited data are available on waterbird densites from other sites. The few comparisons provided in Table 4, above, suggest that the most common waterbirds at Aquatic Park occur in densities that fall within the ranges of waterbird densities elsewhere. The overall waterbird densities appear to be rather high at Aquatic Park. This apparent concentration is due to high numbers of bufflehead and the small size of the site, which may magnify densities in comparison with other sites. We draw a general conclusion from these comparative data: overall, most waterbird species at Aquatic Park occur in densities relatively similar to those at other sites around the bay, however, each site has its unique characteristics and comparisons are coarse, at best. That said, bufflehead in particular (and, to a lesser degree, common goldeneye) tend to occur in higher densities than in most habitats around San Francisco Bay. Tomales Bay, on the outer coast, supports one of the highest abundances of Bufflehead in California (Kelley and Tappen 1998), and densities there are only slightly higher than at Aquatic Park (Table 4).

Distribution of waterbirds among sections

During each survey, waterbirds were systematically assigned to circulation cells within the main lagoon. The purpose was to determine distribution within the lagoon and to evaluate whether that distribution was determined by physical characteristics for which pre-existing data was available (NRMS 2003). Water depths were not readily identifiable from the surface, but circulation cells were clearly defined in the NRMS report. Abundance values (Y-axis) are plotted against circulation cells of the lagoon ("Section," X-axis) below (Figure 6). The pattern of abundance among cells presents a distinct association with birds more abundant in the central sections (#s 5,6,7) than in the other sections. (Note that the two ponds are included in this analysis (MYB = #9; RTP = #10).

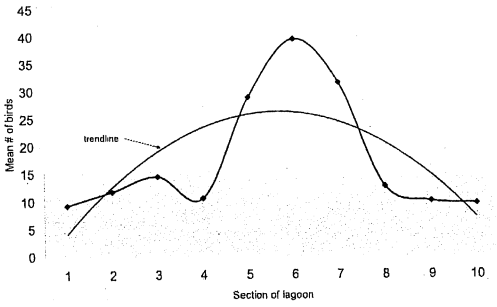
To test the hypothesis that there was a difference in numbers of waterbirds using different circulation zones of the lagoon we examined the variances from the count data. A test of the homogeneity of variance of the total number of waterbirds assigned to each circulation cell (N=8) within the main lagoon found large variance indicating non-homogeneity. Also, for several of the counts the variances were larger than the means, indicating the census data was not

normally distributed. We log-transformed the data prior to analysis to stabilize residual variances.

The log-transformed data (Figure 3) was tested for the homogeneity of variance using the largest and smallest variances. ANOVA found no significant difference among overall the waterbird abundances in the eight circulation cells ($F_{7, 236}$=0.8942, P>0.05).

This conclusion was unexpected, but it might reflect the use of the shoreline by various waders and dabbling ducks; the prime shorebird roosting habitat is in Sections 6 & 7. To address this possibility we proceeded to evaluate use of the cells only by waterbirds that use open water habitats. The abundance of 18 waterbird species classified as "divers" did not differ significantly among the eight circulation cells ($F_{15,12}$=4.132, P>0.05). Although the distribution of rafting waterbird densities within the lagoon was not significant, the untransformed abundance data does show higher use of the centrally located areas of the lagoon, especially cells 5-7 (Figure 6). These cells (#s 5 and 6 in particular) also comprise the largest area and provide the most

Figure 6. Mean number of waterbirds by section



habitat. We did not convert abundances to densities to test this association because the sizes of the cells were not readily available (NRMS 2003). Assignment of birds to cells in the field may have introduced bias, and the distributional pattern was obvious (Figure 6, above). The logical inference is that the configuration of the lagoon and the size of the cells rather than their circulation characteristics. In addition to greater habitat availability, the width of the lagoon in cells 5 and 6 probably provides greater foraging opportunity and the greater distance from shore that rafting waterbirds seem to prefer. This observed distribution is factored into the recommendations, below.

6.0 Result of Disturbance trials

The disturbance trials were performed independently of the waterbird surveys.

Table 5. Disturbance trials: total number of events, all species grouped.

Number of events	Mean flush distance (m)	Standard deviation	Range (m)
286	32.86	18.52	14-50

When the data are partitioned by class, waders, divers, and dabblers are the most prone to disturbance with no significant difference between the three (P>0.05); gulls are less prone to disturbance and those flush distances differed significantly from the other two groups (P<0.01).

Table 6. Flush distances by class.

Group	Number of events	Mean flush distance (m)	Standard error	Range (m)
Waders	34	36.0	3.5	4-56
Divers	208	34.74	1.2	17-51
Dabblers	20	31.00	4.7	10-52
Gulls	24	12.5	1.2	7-18

Waders: The small number of disturbance events affecting waders reflects the relatively low numbers of waders at the site during the trials and the habit of waders to roost along the shore in areas without high levels of disturbance (e.g. Section 6; west shore). Within the wader group, flush distance is related to body size class of each species; egrets and herons typically flush at distances at the high end of the range (50± meters) whereas small flocking shorebirds (e.g. sandpipers) may allow watercraft to pass within 10-m or less. Flush distances may vary with season, however. These distances are derived from winter disturbance trials; during peak migratory periods all waterbirds tend to be more "nervous" and flush more readily than in winter. Also, other studies of shorebirds (but not Ardeids) have shown an increasing sensitivity ather than habituation, i.e., the tendency to be disturbed increases as the number of disturbances increase (Burger 1986). By all accounts, disturbance events are common at Aquatic Park.

Divers: Although the numbers in the table above give a good general picture of flush distances, divers response is dependent on flock size. Larger flocks tend to flush more readily than smaller ones and individual birds are generally much more tolerant of disturbance than flocks (i.e., the Nervous Nellie effect). Bufflehead, the dominant waterbird at Aquatic Park, tends to cluster in

flocks, and therefore their response to disturbance drives the generalized response reflected in Table 6. As with waders, flush frequency increases as the number of disturbances increases. The cumulative effect of repeated disturbance in terms of energy expenditure and depleted fat reserves is unknown. One study in which 17.2 boats per day passed through the study area estimated that waterfowl "may have flown an extra hour each day because of human disturbance" (Korschegen and Dahlgren 1992).

Dabblers: The low number of flush events for dabbling ducks is a function of their behavior; the dominant dabblers (Mallards) tend to congregate along the shoreline of the lagoon, often roosting on the shore, behind the island, or beneath overhanging vegetation. When a watercraft passes, dabblers often paddle slowly toward cover if they were out in the open. This movement away from a watercraft may be considered a "flush," but this response, may be less likely to be noticed by observers because of its furtiveness. Dabblers, like waders, are less likely to occur on open water.

Gulls: Gulls tend to cue on disturbance (wake, *etc.*) and may even move toward rather than away from the source, at least initially. The small mean flush distance found for gulls is expected. Ring-billed gull, the dominant species at Aquatic Park, is among the most habituated to human presence; this is the species commonly found scrounging trash at beaches and parks.

To estimate flush distances of waterfowl, other studies have reported "the upper 95% quantile of standard normal flush distance," that is, the closest distance at which birds will not flush 95 percent of the time [Mean flush distance + (t-distribution $_{0.05,df}$ x sd)]. Rodgers and Smith (1997) added a 40-meter buffer zone to those extrapolated values to allow for unobserved responses prior to flushing. The range of estimated buffer zones are compared in the following table.

Table 7. Flush distances and extrapolated buffer zones based on observed responses of waterbird groups at Aquatic Park. Vales are meters.

Option	A	B	C
Group	Mean flush distance (m)	± $t_{0.05,df}$ x sd	+ 40-m
Waders	36.0	70.3	110.3
Divers	34.7	63.4	103.4
Dabblers	31.0	67.6	107.6
Gulls	12.5	24.5	64.5

These results offer a wide range of distances to inform land use managers in their efforts to minimize or avoid disturbance to wintering waterbirds by watercraft. The mean flush distance (Option A), if implemented as a buffer zone, would avoid disturbance to only a portion (~60%) of waterbirds. The extrapolated values incorporating variance (Option B), would avoid disturbance to 95 percent of the waterbirds. The largest buffer zone (Option C), would avoid virtually all instances of disturbance by watercraft.

The distances in Option C would effectively close the lagoon to watercraft and would not allow enough area for a boat lane. The Option B distances would also essentially close the lagoon, or limit watercraft to a very narrow lane, because of the site's narrow configuration. Using the distances in Option A provides enough room for a functional boat lane, but will cause disturbance to a relatively large proportion of the birds using the site, especially waders and divers, but would reduce disturbance from current levels.

Eliminating disturbances to waterbirds by watercraft is only possible if boating is not permitted in the lagoon. However, reducing or minimizing disturbance is possible and the following recommendations were developed to reduce ongoing levels of disturbance to waterbirds using the lagoon.

7.0 Conclusions and Recommendations

First we will summarize our findings and then develop broad recommendations to minimize or avoid disturbance to the waterbirds that use Aquatic Park.

Waterbird use

- Approximately 80 percent of the waterbirds using the lagoon occur during winter months; summer numbers of birds comprised about 20 percent of the total.
- Waterbird numbers swell from October through March almost entirely due to the arrival of rafting waterbirds, especially bufflehead and scaup.
- Winter months also support the greatest number of species.
- Three species of divers—Bufflehead, Scaup, and American Coot— represented 40 percent of the total watebirds. These three species comprised the bulk of the rafting waterbird population, as well as the preponderance (72.7 %) of disturbance responses. Grouped by class, diving ducks comprised more than 50 percent of the waterbird community. Waders are most abundant during migratory periods in late spring and early fall. Dabblers (Mallards) breed at the site and are the most abundant waterfowl in June. Gulls account for only a small proportion (~5%) of the total.
- The greatest numbers of waterbirds are present in the lagoon during winter storm events.
- There may be some movement out of the lagoon if birds are disturbed or if prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary.
- In general, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon and no movement of waterbirds out of the lagoon due to disturbance was observed in this study.
- The winter waterbird community was distributed evenly with regard to densities around the lagoon, but tended to occur in greater numbers in the widest areas in the central and southern half of the lagoon
- The site is used as a roosting site by migrating shorebird flocks, at least in spring (as evidenced by the April 24 census), however the favored roosting area is one of the least disturbed portions of the lagoon.
- Densities of rafting waterbirds did not differ significantly among sections, however waterbird abundances were greater where greater amounts of habitat were available in the centrally located areas of the lagoon, especially cells 5-7 (Figure 6).

Disturbance parameters

- Based on several hundred independent disturbance events, the mean flush distance for all groups (except gulls) was in the 31-36 meter range and the high-end distance was in the 51-56 meter range. The upper 95 percent confidence-level flush distance was in the 63-70 meter range.
- Flush distances tend to be larger for larger species and smaller for smaller species.
- Disturbance sensitivity is positively related to flock size, therefore greatest when numbers of waterbirds are highest.
- Flush frequency is positively related to the frequency of disturbance, however some species or individuals may habituate (Mazluff *et al.* 1992).
- When a watercraft moves down the middle of the lagoon, waterbirds tend to move to the edges and the ends; also, the water behind (west of) the centrally located island is often used as a refugial area.
- Dabblers take refuge along the shore under overhanging vegetation.
- Waterbird distribution at the site is probably determined more by the configuration of the lagoon and available habitat rather than depth, circulation cells, or any other physical parameters.
- The background level of disturbance at Aquatic Park is very high; sources include noise associated with air and road traffic, pedestrian use of pathways as well as upland and shoreline (especially along the east shore), passing trains as well as watercraft. However, waterbirds may remain sensitive (rather than habituate) to direct disturbance.
- There is no way to know which species or what abundances of waterbirds the site might support if disturbance levels were lower.

Recommendations

To reduce or minimize watercraft disturbance:

1) Create a lane down the center of the lagoon (1/3 the width in the narrowest section, or ~20-m) that relegates boats to a confined area and leaves open water habitat between the lane and the shoreline available to waterbirds. This would also avoid, or minimize, disturbance of birds along the shoreline. Eliminating disturbance entirely is not possible while allowing watercraft use.

2) Concentrate boat use during periods of lowest bird use (April- September) and limit boat use during periods of maximum bird presence (October-March).

3) Limit use, or assign time periods, so that use within that lane is maintained at a level that does not further reduce waterbird use.

4) If racing shells are allowed in the lagoon, request that the tiller handles the coxswain use to beat out the stroke be padded. This will reduce percussive noise disturbance that would mimic gunfire to hunted waterfowl (like scaup).

5) Move the dock northward (~30 m) to increase the area in Section 8 available to waterbirds that are moving away from the boat launching activity.

To reduce or minimize land-based disturbance:

1) Plant willows or some other (preferably native) vegetative screen along portions of the eastern shore. These would provide refuge for roosting waterbirds (e.g. night-herons) as well as increase refuge for dabblers and habitat for migrant songbirds. Screening would also provide added protection and perhaps reduce disturbance events to birds on the open water.

2) Fence portions of the eastern shore to restrict, or eliminate, access by dogs and people to the immediate shoreline. Dense vegetative ground cover or shrubbery might also limit shoreline activity by people and dogs. Recommended set back 10 meters, minimum. This would not only protect the shoreline, but also increase the value of the open water between the boat lane and the shore, buffering it from shore-based activities.

3) Fence off the willow patch in the northeast corner of the RTP to protect the existing night-heron roost from people who enter the thicket frequently.

Discussion of Recommendations

Aquatic Park is an urban park. Urban parks serve as reservoirs for native species in densely populated areas (Baker and Graf 1989, Goode 1991, Marzluff *et al.* 2001). Because natural settings are scarce in urban environments, parks are highly valued and heavily visited by humans and wildlife alike. Studies of parks and natural areas have documented that human disturbance of bird species can have detrimental effects at individual, population, and community levels (Klein 1993, Rodgers and Smith 1995, Fernandez-Juricic and Telleria 2000). Marzluff *et al.* (2001) discuss improvements in park design that that can reduce the negative impacts of bird-human interactions and increase the tolerance by birds to intense human activity.

As those studies point out, bird tolerance can be estimated by flush distance; the larger the flush distance the less the tolerance. Such flush distances may be used to determine appropriate estimates of disturbance buffer-zones or set-back distances to reduce the effect of human disturbance on wildlife. One of their (and our) primary recommendations is an increase in the complexity of habitat structure. Vegetative screens along the shoreline are an example of

increase habitat structure that would likely reduce disturbance to birds using both the shoreline and open water habitats. Flush distances can also be used to gauge the relative size of barriers and habitat patches that might produce a positive response in the avian population. Because all of the species of concern in this study showed a remarkably uniform response in the 30-50 meter range (63-70 meter upper 95 percentile range), those values should be used to determine ideal buffer-zones and/or set-backs.

Some studies recommend distances larger than observed flush distances as a safety factor (e.g. Rodgers and Smith 1997). However, the linear configuration of the lagoon and the surrounding park land limit the opportunities to increase the size of buffer zones at Aquatic Park, therefore, the distances recommended here are considered minimum values.

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Appendix A. Aquatic Park waterbirds, 2004.

Code	Common Name/ scientific name
CAGO	Canada Goose Branta canadensis
GADW	Gadwall Anas strepera
MALL	Mallard Anas platyrhynchos
CANV	Canvasback Aythya valisineria
REHE	Redhead Aythya americana
TUDU	Tufted Duck Aythya fuligula
GRSC	Greater Scaup Aythya marila
LESC	Lesser Scaup Aythya affinis
SUSC	Surf Scoter Melanitta perspicillata
BUFF	Bufflehead Bucephala albeola
COGO	Common Goldeneye Bucephala clangula
BAGO	Barrow's Goldeneye Bucephala islandica
HOME	Hooded Merganser Lophodytes cucullatus
RBME	Red-breasted Merganser Mergus serrator
RUDU	Ruddy Duck Oxyura jamaicensis
PBGB	Pied-billed Grebe Podilymbus podiceps
HOGR	Horned Grebe Podiceps auritus
EAGR	Eared Grebe Podiceps nigricollis
BRPE	Brown Pelican Pelecanus occidentalis, SE, FE (californicus)
DCCO	Double-crested Cormorant Phalacrocorax auritus
PECO	Pelagic Cormorant Phalacrocorax pelagicus
GBHE	Great Blue Heron Ardea herodias
GREG	Great Egret Ardea alba
SNEG	Snowy Egret Egretta thula
GRHE	Green Heron Butorides virescens
BCNH	Black-crowned Night-Heron Nycticorax nycticorax
AMCO	American Coot Fulica americana
BBPL	Black-bellied Plover Pluvialis squatarola
SEPL	Semipalmated Plover Charadrius semipalmatus
KILL	Killdeer Charadrius vociferus
BNST	Black-necked Stilt Himantopus mexicanus
AMAV	American Avocet Recurvirostra americana
GRYE	Greater Yellowlegs Tringa melanoleuca
WILL	Willet Catoptrophorus semipalmatus
MAGO	Marbled Godwit Limosa fedoa
WESA	Western Sandpiper Calidris mauri
LESA	Least Sandpiper Calidris minutilla
DUNL	Dunlin Calidris alpina
SBDO	Short-billed Dowitcher Limnodromus griseus
LBDO	Long-billed Dowitcher Limnodromus scolopaceus
MEGU	Mew Gull Larus canus
RBGU	Ring-billed Gull Larus delawarensis
CAGU	California Gull Larus californicus
HEGU	Herring Gull Larus argentatus
WEGU	Western Gull Larus occidentalis
GWGU	Glaucous-winged Gull Larus glaucescens
CATE	Caspian Tern Sterna caspia
COTE	Common Tern Sterna hirundo
FOTE	Forster's Tern Sterna forsteri
BEKI	Belted Kingfisher Ceryle alcyon

Appendix B. Listed species detected at Aquatic Park during the 2004 field season.

Several species recorded at Aquatic park are included on official lists of rare, threatened or endangered species. The source of their listing is the California Department of Fish and Game's California Natural Diversity Database (CNDDB) list of "Special Animals" (January 2004) and includes those species:

- Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts.
- State or Federal candidate for possible listing.
- Taxa which meet the criteria for listing, even if not currently included on as described in Section 15380 of the California Environmental Quality Act Guidelines. (More information on CEQA is available at **http://ceres.ca.gov/topic/env_law/ceqa/guidelines/**
- Taxa considered by the Department to be a Species of Special Concern
- Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have a critical, vulnerable stage in their life cycle warrants monitoring.
- Populations in California that may be on the periphery of a taxon's range, are threatened with extirpation in California.
- Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands, vernal pools, etc.)
- Taxa designated as a special status, sensitive, or declining species by other state or federal agencies, or non-governmental organization (NGO).

Additional information on the CNDDB is available on the Department of Fish and Game web site at **http://www.dfg.ca.gov/html/database.html**.

California Brown Pelican (*Pelecanus occidentalis californicus*)
As a state endangered, federally endangered, and USFWS Migratory Nongame Bird of Management Concern, the California brown pelican is ranked as "apparently secure [with] some factors existing to cause concern such as narrow habitat or continuing threats" (CDFG 2000). Rookery sites are of primary concern; none exists in SFB, since brown pelicans don't breed in Northern California. All brown pelicans observed in the area are nonbreeding or immature birds. Population impacts to brown pelicans have been the result of pesticide-induced eggshell thinning, oil spills, overharvest of prey, and loss of postbreeding roosting habitat (USFWS 1992). In the SFB, pelicans forage over deep-water habitats and roost on structures such as breakwaters, pilings, and, to a lesser extent, salt-pond dikes. Brown pelicans feed almost exclusively on fish. Outside of the breeding season, brown pelicans are most abundant throughout waters of Central and San Pablo bays, but also occur commonly in the South Bay. Brown pelicans occur at the study site as rare fall and winter (September through March) visitors. The largest pelican roost within SFB is located on the breakwaters south of Naval Air Station Alameda. At Aquatic Park, brown pelicans were noted on only one survey: three individuals on August, 9, 2004.

California Least Tern (*Sterna antillarum browni*)
The California least tern is listed as endangered under FESA and CESA and is also state fully protected. Least terns arrive at nest territories in Northern California in early May and usually

depart by mid-October. Least terns feed in relatively shallow, nearshore waters and coastal freshwater ponds, channels, and lakes. Prey taken in California includes anchovy, silversides (*Atherinops* sp.), and shiner surfperch (Zeiner et al. 1990). Least terns nest on barren to sparely vegetated sites usually associated with sandy to gravelly substrate. In the Bay, least terns most commonly nest on flat, artificial terrain such as bay fill sites and abandoned salt ponds. Sites colonized by nesting least terns are relatively free of human or predatory disturbance. The former Alameda Naval Air Station and the Pittsburg PG&E plant are the only known Bay Area nesting sites still producing fledglings. In 1995, one to three pairs of least terns found nesting at the Oakland Airport failed to produce nestlings due to red fox and feral cat predation. In the past, California least terns were documented breeding at Bair Island and various salt pond levees in the South Bay. After breeding, birds tend to disperse to calm water foraging areas where fish are abundant. Least Terns occur along the Alameda shoreline in spring summer and fall, although they were not detected at Aquatic Park during the 2004 surveys. Least Terns occur regularly in summer at North Basin, Ceasar Chevez Park in Berkeley.

American Peregrine Falcon (*Falco peregrinus anatum*)
This raptor has been recently delisted from FESA, but is still listed as a State Endangered species (CDFG 2000). Peregrines are also a USFWS Migratory Nongame Bird of Management Concern and 'fully protected' by CDFG and ranked as "rare; restricted range" in the CNDDB. As a result of pesticide-induced eggshell thinning, the American peregrine falcon population began to decline in the late 1940s. Recent conservation and recovery efforts have resulted in the delisting of this species from FESA. Peregrines generally nest on protected ledges of high cliffs in woodland, forest, and coastal habitats. However, pairs are also known to nest on human-made structures such as bridges and buildings. In recent years, two pairs of peregrines have been known to nest on the Bay Bridge. Peregrines occur along the Alameda Co. shoreline,with some regularity and several "fly-bys" were noted at Aquatic Park during the course of this study. No foraging on the lagoon was observed.

Barrow's Goldeneye *(Bucephala islandica*
Barrow's Golden eye is a Species of Special Concern (CDFG) with protection of its nesting habitat of primary concern. Barrow's Goldeneyes are essentially extirpated from California as a nesting species; formerly bred in timbered lakes of the high Sierra-Cascade. Winter visitors are rare in the SFB area. One bird was present at Aquatic Park on December 8, 2004.

Black-Crowned Night Heron *(Nycticorax nycticorax)*
Rookery sites for black-crowned night herons are listed as areas of concern (CDFG 2000). Important nest sites around SFB are at Artesian Slough, West Marin Island, and at one time, at Bair Island. Four of 11 identified colonies and 53 percent of all nests in the Bay were on islands in the Central Bay (West Marin, Brooks, Alcatraz, and Red Rock), all of which are north of the Bay Bridge. Both red fox predation (at nest sites) and the toxicity of substrate pose a threat to this species (Kelly 1993; Goals Project 1999). Black-crowned Night-herons were detected on 18 of 22 (82%) of the 2004 Aquatic Park surveys in 2004 with a high count of eleven birds. There is a traditional roost in the willows NE corner of the RTP which should be protected from human intrusion. Birds also roost in the cypress trees on the west shore of the main lagoon.

California Gull (*Larus californicus*)
This gull is a Species of Special Concern (CDFG), and the protection of its nesting habitat is also of concern. California gulls have recently colonized the Bay region as a breeding species.

In 1982, 30 pairs were discovered nesting at Knapp Tract in the South Bay on small islands (submerged dikes) near Alviso. By 1994, that colony had grown to 4,000 pairs. Satellite colonies have developed in the area of Newark and Mowry sloughs. Red fox predation has reduced their numbers in recent years. California Gulls were detected on 6 of 22 (27%) of surveys at Aquatic Park in 2004 with a high count of six birds.

Caspian Tern (*Sterna caspia*)
Nesting colonies of caspian tern are of concern; however, this species is listed as "demonstrably secure; commonly found throughout its historic range" (CDFG 2000). Active South Bay and Central Bay colonies are located at Coyote Hills (west levee), Alviso Pond A7, Hayward Shoreline, Ravenswood Slough, Brooks Island, and Naval Air Station Alameda (Goals Project 19990. Caspian terns are fairly common to common in late spring and summer in SFB, however they were recorded at Aquatic Park on only one survey: 3 birds on April 14, 2004.

Double-Crested Cormorant (*Phalacrocorax auritus*)
The double-crested cormorant is a CDFG species of special concern. Also of concern are their rookery sites. Rookeries are located on the San Mateo and Richmond-SanRafael bridges. This species declined in abundance with sardine population declines, but is recovering lately due to protection and nearshore ecological changes as described by Sydeman et al. (in press). As of 1990, approximately 2,900 pairs nested around the Bay in nine colonies. Their major prey item is fish, although some crustaceans and amphibians have been taken (Zeiner et al. 1990). This species is known to forage year-round in waters of Alameda County and other open-water areas of SFB. This cormorant was recorded on 82 percent of the surveys with a high count of 44 birds on August 9. It roosts and forages at the site regularly. The waterski jump and the island are favored roost sites.

Forster's Tern (*Sterna fosteri*)
The nesting colonies of this species are protected by the CDFG. The species is listed, however, as "demonstrably secure; commonly found throughout its historic range" (CDFG 2000). Locally, Forster's terns can be found nesting in the southern portion of the Bay on islands in salt ponds, sloughs, and marshes. Forster's terns commonly forage over nearshore waters of Alameda County and are fairly common at Aquatic Park. They were detected on 73 percent of the 2004 surveys at Aquatic Park in 2004 with a high count of 86 on august 9. they were most common during the summer months.

Great Blue Heron (*Ardea herodias*)
The great blue heron is listed as "sensitive" by California Department of Forestry with rookery sites of concern (CDFG). Known rookeries are located north of the Bay Bridge and south of San Mateo Bridge (Kelly et al. 1993). This species is fairly common at Aquatic Park, recorded on 36 percent of the surveys with a high count of 11 birds on August 20th. Birds most often forage along the shoreline or roost on the island.

Osprey (*Pandion haliateus*)
Ospreys are listed as a California Special Concern species (CDFG) with a "demonstrably secure" population. Their nesting sites are of primary concern; none has been observed or is known to nest in Alameda County. Most osprey nests in the Bay region are in the North Bay (Marin County). None were detected at Aquatic Park in the course of the 2004 surveys, however one has been seen foraging at the site over Section 8 (E. Strauss, pers. comm.).

Salt Marsh Common Yellowthroat (*Geothlypis trichas sinuosa*)
The salt marsh common yellowthroat is a California Special Concern species (CDFG 2000), mostly resident in fresh and brackish marsh habitat surrounding the Bay, moving into saline tidal marshes in winter. The salt marsh common yellowthroat population has been reduced by 80-90 percent in the past 100 years due to loss of suitable habitat, with this diminution most exacerbated in the South and Central Bay. One yellow throat was hear singing on the April 24 survey; a likely migrant. An increase in willow and shrubbery habitat at the site would increase the viability of the park for this and other migrant insectivores.

Snowy Egret (*Egretta thula*)
Rookery sites of snowy egrets are of concern, although none occurs in vicinity of Aquatic Park. The nearest major breeding sites are at Artesian Slough, Alviso, and West Marin, and at one time at Bair Island (Goals Project 1999). Snowy egrets may congregate in large numbers in salt ponds and seasonal wetlands in response to fish availability. At Aquatic Park they forage in shallow water along the shoreline and roost in trees that overhang the shallows. Snowy egrets were common at Aquatic Park, present on 91 percent of the surveys with a high count of 32 on August 9.

Appendix C. Aquatic park: incidental field notes.

02/11/04
Great Blue Heron flushed from *Scirpus* by hiker (Section 5).
Three dogs ran onto shoreline flushing shorebirds (Sec. 6).
Three skulls present throughout survey, sometimes rowing three abreast.
Two-person kayak on west edge; on e-edge, person polling around on raft.
Song Sparrow (*M.m. pusillula*?) gathering nesting material (Sec. 10).

02/17/04
Storm survey: rain all day yesterday; 6.6" tide at 0631 hrs; wind peak 13.7 knots.
Some dogs off-leash.
Birdwatcher at southend.
Throughout morning did not see any large groups of birds move around lagoon or in-out from bay.

03/11/04
Three boats present during survey: 1500-1649 hrs.

03/31/04
Person walking around Pond #10; Night-Heron roost obscured by foliage.
Two skulls on main lagoon throughout survey.

04/23/04
Mallard with 6 downy chicks; another with 11 chicks.
Peregrine Falcon flew over flushing smaller shorebirds.
Very warm: m any people and dogs out on east trail.
Two kayaks on main lagoon during survey.

05/07/04
Section 6 had no birds onit; two dogs running loose on the west shore.
"Frisbee harvester" walking directly on edge of east shore (Sec. 6).
Common yellowthroat singing in SE corner of Plexxicon parking lot.
Two western gull copulating on waterski island.

06/09/04
At least three borrds of Mallards.

07/26/04
Red-shouldered Hawk chasing Cooper's hawk east of Sec. 8.
One scull present throughout survey; three different rowers.

08/09/04
Train @ 0800; decibel level 83-100.
Power boat enters water via ski launch (CF 8710 PL)
Halfway through count water skiers came through Area 7, flushing some shorebirds.
14 Forester's Terns persisted in mid-lagoon right next to active water skiing.
Large Red-eared Slider [non-native turtle] on lawn near SE corner of main lagoon.

08/20/04
Three skulls in water at start.
One Common Tern [rare here] on Water Ski Island.
Feeding school of several hundred fish jumping and swimming in shallows across from rowing club; cormorants, snowy egret, great-blue heron, greater yellowlegs and willet foraging in water around fish.

09/29/04
Where are all the mallards?
Pond #10 smells abominable.

10/20/04
Dave Ritter accompanies Emilie on survey.
Osprey foraging over Section 8.
No exposed mudflat; heavy rains have raised water level; all shorebirds are roosting on rowing club dock.

10/28/04
20 American Avocets roosting at beginning of survey flushed by off-leash dogs at 1255; some returned to roost later.
One skull and one canoe on water at start of survey.

11/12/04
Four skulls on lagoon at start of survey; one present at end.
About 60 dowitchers circled and returned when dog walker approached shorebird area.
During the course of survey many small groups of Bufflehead and common Goldeneye flying back-and-forth across lagoon as skulls disturb them.

11/17/04
Merlin fly by!
Five kayaks.

11/30/04
Woman arrives and feeds mallards 3 large bags of bread.
Kayak paddles w/in 10-m of water ski island and flushes 32 cormorants.

12/22/04
One Snowy egret flushed from shore by ball thrower/dog.
200 shorebirds flushed from west shore (Sec 7); flew short distance and returned.
One skull at beginning of survey; none at end.

Golden Gate Audubon Society
2530 San Pablo Avenue, Suite G • Berkeley, California 94702
Phone: (510) 843-2222 • Fax: (510) 843-5351 • Email: ggas@compuserve.com
Americans Committed to Conservation • A Chapter of the National Audubon Society

January 4, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR Notice of Preparation

Dear Mr. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Notice of Preparation (NOP). The GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly the GGAS is in general strongly supportive of the projects described in the NOP.

However certain aspects of the Measure DD projects pose clear risks to the habitat and natural resource values of the Lake Merritt Channel (LMC) in particular. Because of its constrained size the LMC is more sensitive to disturbance from human activity than is the lake itself. The DEIR needs to carefully evaluate these risks and to develop appropriate mitigation measures to avoid or minimize them.

The risks in question are the following:

1. **CONSTRUCTION-RELATED IMPACTS FROM 10TH AND 12TH ST. RECONSTRUCTION PROJECTS.**

The 10th and 12th St. reconstruction projects will be carried out directly in and adjacent to the LMC. They will involve substantial amounts of highly disruptive activity in the form of demolition, excavation, and grading. The noise and percussive effects from these projects will have a clear and indisputable adverse impact on the natural resource and habitat values of the LMC. During the periods when construction activities are occurring these impacts will in significant portions of the LMC prohibit migratory and other waterfowl that would otherwise be expected to use the LMC for foraging and resting from doing so.

It is of critical importance that the DEIR acknowledge these impacts and analyze appropriate mitigation measure to reduce if not eliminate them to the maximum extent possible. Such measures should include at minimum confining to the non-migratory waterfowl season of April – September at least those construction activities likely to cause the greatest disturbance to the LMC's habitat values.[1]

2. **IMPACTS FROM OPENING THE LMC TO RECREATIONAL SMALL BOAT PASSAGE.**

The regionally significant natural resource and habitat values that the LMC currently supports can be attributed in no small part to the fact that it is and has been for decades closed to boat traffic. A recent study performed for the City of Berkeley to assist it in planning for its Aquatic Park documents the disturbance that boating and other human activity can cause to foraging and resting ducks and other birds. The Measure DD projects will open the LMC to small boat passage for the first time in perhaps over a century.

It is critically important that the DEIR evaluate the potential for boat traffic to degrade the high quality waterfowl habitat that the LMC currently supports. It is equally important for the DEIR to evaluate measures to reduce such impact to the absolute minimum. Such measure should include 1) a ban on all motorized boat traffic, and 2) a seasonal closure of the LMC to boat traffic to coincide with the closure of the Trestle Glen arm of Lake Merritt to recreational boating (Nov. 1 – Apr. 1).

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers
Member, East Bay Conservation Committee

[1] As is evidenced by the seasonal restrictions to protect fish habitat on construction activity associated with the new SF Bay Bridge project, such seasonal restrictions are not uncommon.

From: Dr. Bailey [lmi@netwiz.net]
Sent: Wednesday, December 27, 2006 11:42 AM
To: eathornton@Oaklandnet.com; Kerry Jo Ricketts Ferris; driley
Subject: DD EIR

Greetings: Having not seen (or mis-placed?) the scoping notice, I am unsure if the EIR includes all DD projects, or is focused only on the tree issue. If it will consider all DD projects, please consider the following comments in preparation of the EIR.

Background: I was part of the Master Plan team that preceded DD and assisted (with regard to Lake Merritt water quality projects) in developing the DD language. For the last ten year or more I have occupied an office at 568 Bellevue - The Sailboat House. I understand that renovation of this building has been postponed to phase II or III.

Comments: The master plan and DD call for returning 568 Bellevue to its original architectural form, which includes replacing the secure, fenced storage area between garages with a new entrance to the street, new windows on the street side etc. This is all well and good, except there are other, much more pressing issues here that far outweigh the importance of those recommendations. For example:

1. The bulkhead wall facing the Lake is sinking and needs to be rebuilt. The same thing happened at the Nature Center a few years ago.
2. There is no clean out opening in the sewer line from the bathrooms to the sewage pump at geodesic dome. This is a long, flat sewer that sometimes backs up. A clean out opening, located mid-way, is a much needed improvement. Check with the Public Works guys that try to clean it.
3. The bathrooms are VERY MUCH in need of renovation, especially the mens room.
4. Energy efficient light switches on sensors or timers would save the city a lot of money. Lights in the rental room are often left on.
5. How about a solar and/or a green roof?
6. Two classrooms leak water through the floor! Both the main classroom and the one below me are wet when rains are heavy.
7. There is no heat in any of the four classrooms.
8. There is no electric power on the docks. This requires long extension cords to pump out the boats; prevents active bird control actions, reduces security (no lights) etc.

My suggestion for renovation of this site would be to fix the above listed problems, and to:

Level the existing linear garages and main classroom and replace them with a two story building on the same footprint. This could provide badly needed boat storage, more office and classroom space and a laboratory for the Oakland High Environmental Academy that studies marine life in the Lake here every week. The master plan team objected to this, saying it would block the view of the Lake from Bellevue Avenue. But this view is already blocked by trees, and people do not turn their head 90 degrees to look in this direction when driving (they watch the road). Such a new building would bring the existing classrooms up to code and allow expansion of educational opportunities.

When the master plan was being written, Harry Edwards was in charge of Parks & Recreation. He forbid any staff, including the director of the Boating Center, from talking with the planning team. He also blew off two meetings with the team and never did meet with them. In my opinion, that is why the problems listed above were not included in plan recommendations.

Funds like DD only come along once in several decades. It would be foolish to make something prettier (in the eyes of some beholders) when all these problems need to be fixed first.

Since Dana is in charge of the Boating Center, I am probably speaking out of turn, and her views on these comments should take priority.

Hopefully these recommendations can be addressed in the EIR and the next round of DD plans.

Dick Bailey

file://H:\Measure DD Project\NOPComments\NOPComment.FrDrDickBailey.htm 12/29/2006

APPENDIX C

NOTICE OF PREPARATION AND SCOPING COMMENT LETTERS

**NOTICE OF PREPARATION (NOP) OF A
DRAFT ENVIRONMENTAL IMPACT REPORT (EIR)
MEASURE DD PROJECT**

The Oakland Community and Economic Development Agency, Planning and Zoning Division, is preparing a Draft Environmental Impact Report (EIR) for the Measure DD Project, and is requesting comments on the scope and content of the EIR. The City of Oakland is the Lead Agency for the project and is the public agency with the greatest responsibility for either approving the project or carrying it out. This notice is being sent to Responsible Agencies and other interested parties. Responsible Agencies are those public agencies, besides the City of Oakland, that have a role in approving or carrying out the project. Responsible Agencies will receive a copy and use the EIR when considering approvals related to the project. When the Draft EIR is published, it will be sent to all Responsible Agencies and to others who respond to this NOP or who otherwise indicate that they would like to receive a copy.

Written comments on the NOP must be received **by 5:00 p.m. January 8, 2007**. Your response and any questions or comments on this NOP should be directed to: Elois Thornton, Planner IV, Community and Economic Development Agency, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612; 510-238-6284 (phone); 510-238-6538 (fax); eathornton@oaklandnet.com. Please reference case number ER060017 in all correspondence. In addition, comments may be provided at the EIR Scoping Meeting to be held before the City Planning Commission.

**EIR SCOPING MEETING – CITY PLANNING COMMISSION
Wednesday, January 3, 2007
6:30 p.m.
City Hall, 1 Frank H. Ogawa Plaza
Hearing Room 1**

PROJECT TITLE: Measure DD Project

PROJECT LOCATION: The Measure DD Project has components located throughout the City of Oakland. Please see Figures 1, 2, and 3 which show the locations of the project components.

PROJECT SPONSOR: City of Oakland

PROJECT DESCRIPTION: Measure DD is a municipal bond measure passed by Oakland voters in 2002. Measure DD authorizes the City to issue bonds that fund two types of activities or actions—those that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. Activities funded by Measure DD are grouped as follows:

- Lake Merritt and Lake Merritt Channel
- Oakland Waterfront Trail and Access
- East and North Oakland Recreational Facilities
- City-wide Creeks

The components of each group are listed in Table 1 and described below. Figures 1, 2, and 3 show the approximate locations of the Measure DD activities.

Lake Merritt and Lake Merritt Channel

The major components in the Lake Merritt and Lake Merritt Channel group are the 12th Street Reconstruction, Lake Merritt Channel, Lakeshore Avenue/El Embarcadero, Lakeside Drive/Municipal Boathouse, Bellevue Avenue Redesign, and Snow Park/Lakeside-Harrison-20th Street Intersection. Additional components include the renovation of Children's Fairyland, renovation of the Pergola, neighborhood connections at Cleveland Cascade and E. 18th Street, water quality improvements for the Lake and others as identified and briefly described in Table 1. The major components are described in additional detail in the following paragraphs.

12th Street Reconstruction

The 12th Street Reconstruction involves reconfiguring the existing 12-lane expressway across the 12th Street dam into a six-lane, tree-lined boulevard. Removal and replacement of the existing roadway would allow the City to create four acres of new parkland along the south shore of Lake Merritt. The new park would contain a landscaped area, an overlook plaza, multi-use paths and a restroom. The project limits extend from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue. Lakeshore Avenue would be made into a cul de sac near 12th Street, and traffic flow diverted onto 1st Avenue. The existing culverts at Lake Merritt Channel would be replaced with a clear-span bridge. A tidal wetland would be created along the Channel at Peralta Park.

Existing plantings and irrigation would be renovated. This includes removing existing trees from the median strip along 12th Street, from the Kaiser Convention Center parking lot and from some areas along the banks of the Lake Merritt Channel and replanting with new trees. The trees are being removed because they are in conflict with the new construction, are diseased, have severe structural defects, or are fast-growing, short-lived trees reaching the end of their life expectancy.

Lake Merritt Channel

The Lake Merritt Channel is a narrow waterway that connects Lake Merritt with the Estuary and San Francisco Bay. Measure DD components along the Channel are intended to improve water flow, provide small boat passage, enhance bicycle and pedestrian access, restore wetlands, and make other Channel and shoreline improvements. Major work includes replacement of the restrictive culvert at 10th Street with a clear-spanning bridge and construction of a gated by-pass channel around the 7th Street Flood Control Station, which is operated by the Alameda County Flood Control District. Some trees along the Channel would be removed in order to create open water and wetlands as part of the Channel improvements.

Lakeshore Avenue / El Embarcadero

Improvements along Lakeshore Avenue would include the addition of bike lanes along the roadway and the renovation of landscaping between the roadway and the lake. Lakeshore Avenue would be narrowed from four lanes to two lanes for vehicle traffic and would include Class 2 bike lanes. The number of on-street parking spaces would remain approximately the same as existing.

Table 1: Measure DD Components

LAKE MERRITT AND LAKE MERRITT CHANNEL
Water Quality
Replace the 12th Street culvert at Lake Merritt Channel with a bridge to increase tidal flow into, and flushing of, Lake Merritt
Install stormwater filters, floating trash barriers, and aerating fountains, and implement other water quality improvements, including goose management elements
Construct a bridge to replace the existing culvert at 10th Street
Redesign the Lake Merritt flood control station under 7th and 8th Streets
Recreation and Youth Activities
Renovate Children's Fairyland
Renovate the Municipal Boathouse at 1520 Lakeside Drive and return it to public use
Renovate the Sailboat House and convert some of the adjacent parking lot to parkland
Park Restoration and Access
Reconfigure 12th Street, create a new 4-acre park, and connect these features to the Lake Merritt Channel
Implement system-wide improvements including paths, irrigation, landscaping, furnishing, restrooms and signs
Repair or replace Lake Merritt retaining walls
Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue)
Redesign Bellevue Avenue to improve circulation and to accommodate parking moved from the Sailboat House
Expand Snow Park and redesign the Lakeside/Harrison/20th Street intersection
Consolidate the El Embarcadero roadway to form a "Grand Lake green link"
Provide waterfront public access, shoreline, and landscaping improvements
OAKLAND WATERFRONT TRAIL AND ACCESS
Water Quality Improvements and Hazardous Materials Remediation
Acquire land for conservation and remediation purposes
Remediate hazardous materials from contaminated soils
Waterfront Trail and Parks Acquisition and Construction
Provide continuous public access from Jack London Square to Martin Luther King Jr. Regional Shoreline
Construct an access/overlook area at 66th Avenue
Acquire and develop Estuary Park, Meadow Park and a new park in the area of the 9th Avenue Terminal
Complete Union Point Park
EAST AND NORTH OAKLAND RECREATIONAL FACILITIES
Construct the East Oakland Sports Complex
Renovate and restore Studio One
CITY-WIDE CREEKS
Restore and rehabilitate creeks by creating natural meanders, regrading and stabilizing banks, removing failing structures, and landscaping with native plants
Acquire creekside properties to facilitate restoration and habitat preservation

The southern-most traffic couplet on El Embarcadero would be closed to vehicle traffic and would be reconstructed to accommodate the multi-use trail and a new formal plaza area just north of the Pergola. The northerly traffic couplet of El Embarcadero would be widened by approximately two feet toward the Library to safely accommodate two-way traffic. The northerly traffic couplet would be configured with two lanes going eastbound and one lane going westbound.

Approximately 9 acres of existing planting and irrigation would be renovated along Lakeshore Avenue. This includes removing existing trees and replanting with new trees. The trees are being removed because they are diseased, have severe structural defects, are crowding buildings, are in conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy.

Lakeside Drive/Municipal Boathouse

Lakeside Drive, located on the west side of Lake Merritt, would be restriped from four lanes to two lanes for vehicle traffic and would include a Class 2 bike lane. The number of on-street parking spaces would be increased by constructing a median and moving the curb. A multi-use path would be created near the shoreline.

The Municipal Boathouse would be converted from an office facility and would undergo major tenant improvements and structural work. On the upper levels of the renovated Boathouse, space would be provided for a restaurant, a café and a meeting room. On the lower levels, boating facilities would be upgraded to meet current use requirements. Existing parking facilities at the Boathouse would be relocated and consolidated into a single, 28-space lot to be constructed in the existing lawn area north of the Boathouse.

Approximately 4 acres of existing planting and irrigation would be renovated, which includes removing existing trees and planting new trees. The trees are being removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy.

Bellevue Avenue Redesign

Bellevue Avenue, located at the north end of Lake Merritt, would be widened by approximately 11 feet to accommodate diagonal parking (being relocated from the Sailboat House parking lot). Lighting and landscaping would be improved and sidewalk bulb-outs at intersections would be incorporated to improve pedestrian crossings. A parallel pedestrian path would be provided and the Grand Avenue intersection with Bellevue would be narrowed to one lane to improve pedestrian conditions.

Snow Park/Lakeside-Harrison-20th Street Intersection

This project component would reconfigure the street system in the vicinity of Snow Park, which would including the narrowing of Lakeside Drive from four travel lanes to two between 14th and 17th Streets and from four lanes to two between 19th and 20th Streets. Improvements would also include the addition of a northbound bicycle lane in the segment from 15th to 17th Streets and bicycle lanes in each direction within the segment from 19th Street to 20th Street, and the removal of 20th Street between Lakeside Drive and Harrison Street, which would be converted to parkland for both Snow Park and Lake Merritt Park.

Oakland Waterfront Trail and Access

The Oakland Waterfront Trail is a part of the San Francisco Bay Trail, a planned 400-mile network of bicycle and hiking trails that will form a continuous ring around the Bay. Measure DD is intended to help close the gaps in a 6.6 mile portion of the trail between Jack London Square and 66th Avenue. Properties along the waterfront designated for parkland development by Measure DD would be acquired and remediated, as needed. A cleanup plan would be developed for each site where soil or groundwater is contaminated above risk-based clean-up standards. Such plans would specify measures to be taken to protect workers, the public and the environment during remediation. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency.

East and North Oakland Recreational Facilities

The two components within this group are the renovation of the historic Studio One Art Center, located in North Oakland and the construction of an East Oakland Aquatic, Sports and Recreation Complex (Figure 2). Studio One requires extensive seismic reinforcement, new heating, ventilating, lighting, and plumbing systems, plus interior and exterior finish work. Renovation is intended to improve accessibility and functionality and provide maximum flexibility and public safety, while preserving the Studio One's non-institutional atmosphere and historic façade. The East Oakland Aquatic, Sports and Recreation Complex is a proposed 150,000 square foot addition to and expansion of the existing Ira Jenkins Park/Recreation Center at Edes and Jones Avenues in East Oakland. The facility would likely include a 50-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley. Measure DD money has been allocated toward this project, but additional funding must be secured before the project can move forward.

City-Wide Creeks

Oakland's watershed has fifteen main creeks with over thirty tributaries that comprise over 40 miles of open creeks. As part of Measure DD funded activities, the City would restore various targeted creek sites (Figure 3). The intent of the restoration is to improve water quality, hydrology and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship. Specific activities may include creek bank stabilization, riparian habitat restoration, hydrology restoration, public education displays, erosion control, and introduction of native wildlife. Creeks specifically called out in Measure DD were Sausal Creek, Lion Creek, Palo Seco Creek, Cinderella Creek, Arroyo Viejo Creek, Shepard Creek, Glen Echo Creek, Coliseum Slough, Horse Shoe Creek, San Leandro Creek, Peralta Creek, and Courtland Creek. All work would be accomplished in accordance with the City's "Creek Protection, Stormwater Management and Discharge Control Ordinance."

Measure DD also provides funding to acquire high-value, restorable habitat, watersheds of creek segments with presence of rainbow trout and other wildlife populations, and property of high aesthetic and water quality protection values. Restoration activities as described in the preceding paragraph would be performed, as required.

PROBABLE ENVIRONMENTAL EFFECTS: An Initial Study has not been completed for the project and thus the EIR will include a discussion of potential environmental effects for each of the environmental topics included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which include:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Utilities and Service Systems

One or more parcels in the project area may be listed on the "Cortese List" of hazardous waste sites (Government Code Section 65962.5).

Actions/approvals by the City that may be necessary for these projects include without limitation: design review; conditional use permit; tree removal; and grading.

December 8, 2006
File Number ER060017

For Claudia Cappio
Director of Development and Environmental Review Officer

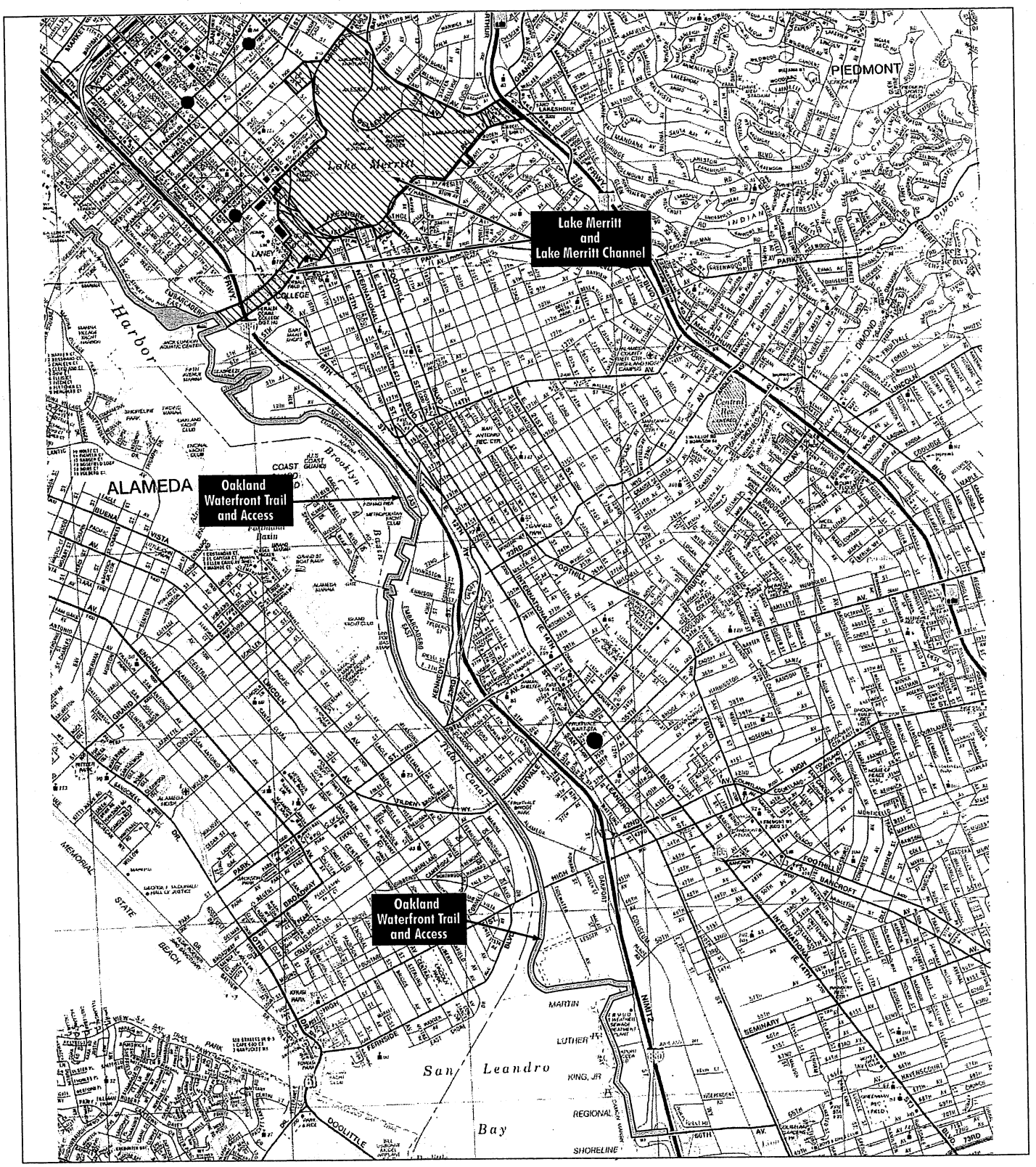


FIGURE 1

LSA

LEGEND

LAKE MERRITT AND LAKE MERRITT CHANNEL

OAKLAND WATERFRONT TRAIL AND ACCESS

0 1600 3200
FEET

Oakland Measure DD
Project Vicinity Map 1

SOURCE: CSAA; LSA ASSOCIATES, INC., 2006.

I:\RAJ0606 measure dd\figures\Fig_1.ai (12/6/06)

LSA

FIGURE 2

LEGEND

PROJECT SITES

0 1500 3000
FEET

Oakland Measure DD
Project Vicinity Map 2

SOURCE: CSAA; LSA ASSOCIATES, INC., 2006.

I:\RAJ0606 measure dd\figures\Fig_2.ai (12/4/06)

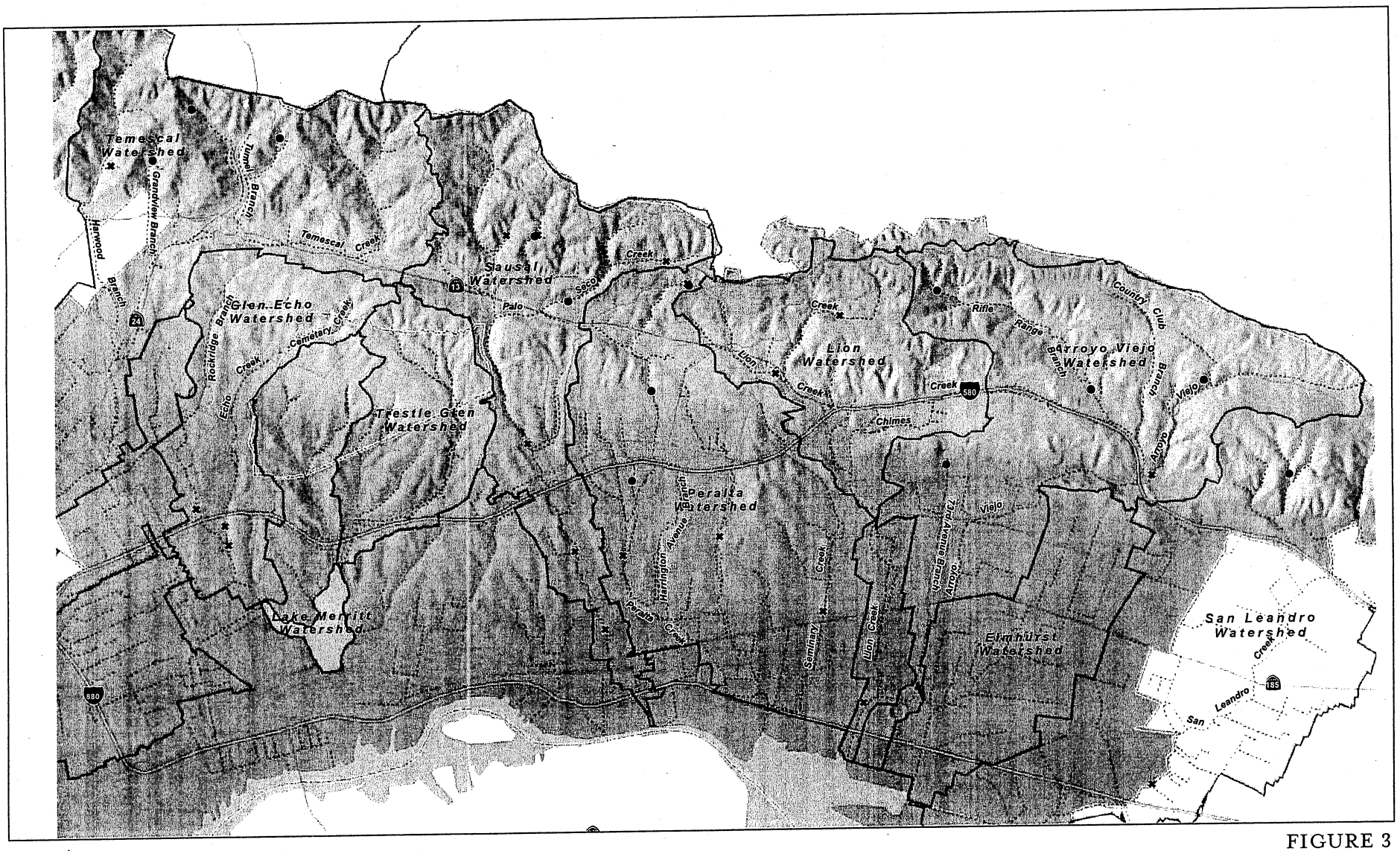


FIGURE 3

LSA

- Restoration Sites
- Preservation/Acquisition Sites
- City Streets
- Streams
- Drainage Areas
- Interstate
- US Highway
- State Highway
- City Limits

N

0 4400 8800
FEET

Oakland Measure DD
Oakland Creek Acquisition and Restoration Sites

SOURCE: JONES & STOKES
I:\RAJ0601 measure dd\figures\Fig_3.ai (12/8/06)

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Community and Economic Development Agency
Planning & Zoning Division

(510) 238-3941
FAX 510) 238-6538
TDD (510) 839-6451

MEASURE DD ENVIRONMENTAL IMPACT REPORT (EIR) PROJECT

NOTICE OF EXTENDED SCOPING PERIOD

TO: All Interested Parties

At the Oakland City Planning Commission's January 3, 2007 Public Scoping Session for this project, the Commission elected to extend the period for receipt of comments on the scope and contents of the forthcoming Measure DD Draft EIR. The previously-noted public comment period (December 8, 2006 – January 8, 2007) has been extended for an additional two weeks. **The deadline for receipt of comments on the content and scope of the Draft EIR is now January 22, 2007 (5:00 p.m.).**

Comments must be in writing and may be sent to:

City of Oakland Community and Economic Development Agency
Attn: Elois A. Thornton, Planner IV
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Or may be e-mailed to: eathornton@oaklandnet.com

If you have questions and/or need further information, please contact me at (510) 238-6284.

LSA
JAN - 5 2007
RECEIVED
Berkeley

Elois A. Thornton
Planner IV

Date of Notice: January 4, 2007
File No. ER06-0017

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

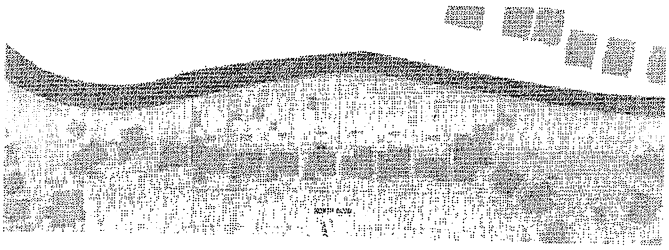
Ms. Thornton – The City of San Leandro is in receipt of the NOP for the above-referenced project (and the Notice to Extend the Scoping Period). In reviewing Figure 3 attached to the NOP, there is one 'Restoration Site' noted at a location that appears to be on the Oakland/San Leandro border (along San Leandro Creek, in the vicinity of North Boulevard – see map included at the bottom of email). According to Table 1 of the NOP, Restoration Sites in general include restoration and rehabilitation of creeks by creating natural meanders, regrading and stabilization of banks, removing failing structures and landscaping with native plants. In the vicinity of this proposed restoration site, properties within the City of San Leandro that 'back up' to San Leandro Creek actually have the property lines extending towards the creek's center line. Because more detailed information on the Restoration Site is not provided in the NOP, for the purpose of the DEIR analysis, we would like to make sure that any potential impacts to residents/resources under the jurisdiction of the City of San Leandro are analyzed and as appropriate, mitigation provided.

If the DEIR will be available on-line, I'm happy to review the document in that format. If the DEIR will only be available in a hard copy format, please mail it directly to me at the city address indicated below. Thank you for the opportunity to comment on the Measure DD DEIR NOP.

Sincerely,

Debbie Pollart, Planning Manager
Community Development Department
835 E. 14th Street
San Leandro, CA 94577
510/577-3327
510/577-6007 (fax)
dpollart@ci.san-leandro.ca.us
www.ci.san-leandro.ca.us

Enlarged map of San Leandro area in proximity to Restoration Site indicated in Measure DD NOP -



From: Kathleen Eichmeier [KEichmeier@actransit.org]
Sent: Monday, January 22, 2007 10:07 AM
To: cathornton@oaklandnet.com
Cc: Nathan Landau; Nancy Skowbo
Subject: Comments on Measure DD NOP
Attached please find AC Transit's comments on the NOP for the Measure DD Projects EIR. Original follows via US Mail.

Kathleen Eichmeier
Executive Administrative Assistant
Service Development Department
AC Transit
1600 Franklin Street
Oakland, CA 94612
Ph: 510.891.4837
Fx: 510.891.4837
Em: keichmei@actransit.org

1600 Franklin Street, Oakland, CA 94612 - Ph. 510/891-4716 - Fax. 510/891-7157
Nancy Skowbo
Deputy General Manager - Service Development

January 22, 2007

Elois Thornton
Planner IV
Community and Economic Development Agency
City of Oakland
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: Notice of Preparation of Draft Environmental Impact Report for Measure DD Project

Dear Ms. Thornton:

Introduction
Thank you for the opportunity to comment on the Notice of Preparation (NOP) for a Draft Environmental Impact Report (EIR) for projects being implemented pursuant to Measure DD.

Measure DD is a $198 million bond passed by the voters of Oakland in 2002. Measure DD provides funds for park, recreation and open space projects throughout Oakland, with an emphasis on the Lake Merritt and Oakland waterfront areas. It also provides funds to develop a park in the former 9th Avenue Terminal area, the area where the Oak to 9th Project has been approved (pending legal actions).

AC Transit has been working closely with the City of Oakland to assure that Measure DD projects—particularly the reconfiguration of the 12th Street Dam roadway—do not degrade the quality of transit service. We appreciate the efforts of the Public Works Department in this regard.

AC Transit is pleased that a comprehensive and well organized analysis of the impacts of the many Measure DD projects will now be made. While AC Transit supports the intent of Measure DD in providing recreational amenities for Oakland residents, we continue to be concerned about the potential for impact on transit operations. The EIR provides an opportunity to systematically identify, analyze, and mitigate those impacts, and should be used for that purpose.

The Crucial Role of 12th Street Dam for East Oakland Transit Service
The project that is most significant to AC Transit involves the substantial narrowing of the roadway across Lake Merritt on the 12th Street Dam. A roadway that now provides six lanes in each direction would be reduced to three lanes in each direction.

AC Transit understands that the City wishes to make these changes to improve the pedestrian environment around Lake Merritt. AC Transit has been a strong supporter of the City's efforts to improve conditions for pedestrians throughout Oakland, not least because the great bulk of Oakland bus passengers walk to their bus stops. However, pedestrian improvements should not be achieved at the expense of transit passengers, who are often the very same people.

The importance of 12th Street Dam as a transit route cannot be overstated. Five bus routes (Lines 13,14,15, 40, 43, and 82/82L) connecting East Oakland with Downtown Oakland and other areas use the roadway. All but two of the bus routes that connect Downtown with East Oakland below Macarthur Boulevard use 12th Street Dam. There are up to 58 buses per hour—one per minute—that cross the dam. 12th Street is the location for the 1 Rapid bus, which will go into service next year, as well as the proposed location for the Bus Rapid Transit (BRT) line. 12th Street Dam is one of the busiest transit corridors in the entire Bay Area, and is the most important route segment in the AC Transit system after Broadway in Downtown Oakland.

Potential for Bus Delays on 12th Street
The reconstruction of 12th Street creates the potential for delay to buses, both during the several years of construction as well as with the final roadway. The capacity of 12th Street will be reduced by more than 50%, with the reduction in lanes and the introduction of new traffic signals on the dam. The EIR should analyze the likely impact of roadway changes on bus speeds both during construction period and with the final configuration.

Delay is the single most important potential impact to bus service and should be analyzed as such. Delay degrades service to passengers, many of whom are low and moderate income East Oakland residents. Sufficiently bad delays may lead to passengers switching to other modes, such as driving. Delay also has the potential to impose substantial costs on AC Transit itself. If travel delays disrupt bus schedules, it may be necessary to operate additional buses to maintain the "headway" (frequency) on the routes. The cost of adding just one full time bus is approximately $250,000-$300,000 per year. Small delays may force the addition of numerous buses because many bus routes are already tightly scheduled and there is little slack time in the schedules.

Cumulative Impacts of Delays to Transit
In addition to considering the potential impacts of delays because of the 12th Street project, the EIR should also consider the potential for cumulative delay-causing impacts. Cumulative impacts could occur if projects were implemented elsewhere along bus routes that cross the 12th Street Dam that also caused delay. These projects could potentially be implemented by the City of Oakland or other agencies.

The EIR should identify any future anticipated projects that would reduce bus travel speed on corridors served by buses which cross 12th Street Dam. These projects could include reductions in the number of lanes in order to provide bicycle lanes, traffic calming, or for other reasons. They could include changes in roadway width, configuration, signal timing, or other characteristics of a street. Buses which cross 12th Street Dam operate primarily on 11th Street, 12th Street, Foothill Boulevard, E. 15th Street, International Boulevard, Park Boulevard, Lakeshore Avenue, Martin Luther King Junior Way, and Telegraph Avenue.

The Foothill corridor (used by Lines 40 and 43) has been subject to several projects in recent years which have slowed bus operating times. These projects have already reduced AC Transit's ability to absorb further delays.

Mitigations to Traffic Delays: Bus Lane, Transit Signal Priority
One way to mitigate the impact on 12th Street traffic would be the creation of a dedicated bus lane from Oak Street to First Avenue across Lake Merritt. The EIR should evaluate an alternative or design option that provides a dedicated lane across the dam. The volume of bus activity and the importance of the route justify a dedicated lane. It would provide a connector between the proposed bus lanes in the Downtown Oakland and International Boulevard sections of the BRT.

Transit signal priority should also be analyzed and recommended for the new signals on the 12th Street Dam. Transit signal priority extends green time to allow a bus to pass through a signal, or shortens red time to limit delay at a signal. Transit signal priority is being used on San Pablo ., and will be used on International Boulevard and Telegraph Avenue with the startup of the Rapid. Transit Signal Priority would reduce signal delays for buses crossing the dam. It would be most effective in conjunction with a dedicated bus lane. Transit Signal Priority would still provide benefit without a bus lane, particularly if it were coupled with "queue jump" lanes at traffic signals, allowing buses to pull around queues of waiting cars.

Easterly Crosswalk at 12th Street/14th Street Intersection
The project proposes to add a traffic signal and crosswalks at the intersection of 12th Street and 14th Street on the dam. AC Transit is very concerned about the potential impact of the easterly crosswalk to the Lake side at this intersection, and believes it should be eliminated from further consideration. The intersection is roughly T shaped. To allow pedestrians to safely use the easterly crosswalk, all traffic movements in the intersection must stop. This is not true of the proposed westerly or southerly crosswalks. The easterly crosswalk does not provide direct access to any sites, leading only to a wall of the Oakland Museum.

Traffic analyses conducted before scoping have shown traffic backing up from this intersection through the 11th Street access tunnel as far as Oak Street. Such a backup would be detrimental to bus service, general vehicle traffic, and air quality. The potential impacts of the current intersection configuration lead us to strongly suggest elimination of the east side crosswalk.

Mitigations to Construction Traffic Delays
Construction period traffic impacts are a major concern for AC Transit. Because of the complexity and scope of the Measure DD projects, particularly around the 12th Street Dam, construction can be expected to last for several years. City and AC Transit staff have jointly identified and agreed upon a series of construction mitigations to be used in various phases of reconstruction of the 12th Street Dam and approaches to it. These mitigations were documented in meeting minutes and other written correspondence. (copies of the correspondence are attached to this letter). From the meeting minutes, we would particularly highlight reference to the importance of minimizing the time when buses are detoured onto 10th Street and 2nd Avenue. We also note the importance of conducting "short duration" work at night between 8:00 p.m. and 6:00 a.m.

Lakeside/Harrison/20th Street intersection
The project proposes to reconfigure the intersection of Lakeside, Harrison, and 20th Streets to improve pedestrian access to Lake Merritt. The project would eliminate the section of 20th Street between Lakeside Drive and Harrison Street to create parkland there. That segment of 20th Street is used by Line 59 which travels from Lake Merritt BART to the Pill Hill area and beyond. Line 59 would need to be rerouted, with potential impacts on streets it was rerouted to, such as loss of parking spaces to create bus stops. The potential for impacts on various streets in the Lakeside and "Gold Coast" neighborhoods should be discussed in the EIR.

Relationship to Grand/Macarthur Project
AC Transit is developing a plan for Transbay Rapid bus service on the Macarthur-Grand corridor in Oakland, continuing to San Francisco (the route of the current NL). Around Lake Merritt, the Rapid from East Oakland would run west on Grand Avenue, south on Harrison Street, then west on 20th Street/Berkley Way. In collaboration with the City of Oakland, AC Transit is preparing proposals for the physical changes necessary for Rapid operation. Along Harrison Street between Grand and 20th Street these include (but are not necessarily limited to) signal coordination/priority, a bus stop at Harrison & 21st Street and bus lanes along Harrison and 20th Street.

The EIR should acknowledge the planned Rapid as an anticipated project. The EIR should assure that nothing in the Measure DD project would interfere with the implementation of the Macarthur-Grand Rapid. If there are unavoidable conflicts, these should be noted as significant impacts, and appropriate mitigations developed in consultation with AC Transit.

AC Transit looks forward to continuing to work with the City of Oakland to assure that the Measure DD project is implemented in a transit supportive manner. If you have any questions about this letter, please contact Nathan Landau at 510-891-4792 or nlandau@actransit.org.

Sincerely,

Nancy M. Skowbo

Nancy Skowbo
Deputy General Manager for Service Development

Attachments

cc: Jim Gleich, AC Transit Deputy General Manager
Anthony Bruzzone, AC Transit Transportation Planning Manager
Tina Spencer, AC Transit Long Range Planning Manager
Jim Cunradi, AC Transit Senior Transportation Planner
Robert del Rosario, AC Transit Senior Transportation Planner
Nathan Landau, AC Transit Senior Transportation Planner

AC TRANSIT
1600 Franklin Street, Oakland, CA 94612 · Ph. 510/891-4722 · Fax. 510/891-7157

Zia Dairkee
Assistant General Manager - Architecture and Engineering

August 29, 2006

Jose Martinez, P.E.
CIP Coordinator
Public Works Agency
City of Oakland
250 Frank H. Ogawa Plaza
Oakland, CA 94612-2033

Re: 12th Street Reconstruction Project

Dear Mr. Martinez:

Thank you for meeting with representatives of AC Transit on August 22, 2006 to review and discuss the proposed construction staging/detours for the 12th Street Construction Project. It was an effective meeting and we appreciate the City's efforts to mitigate the impacts the project would have on AC Transit's service through this area. As discussed at this and prior meetings, about 850 buses per weekday operate through this corridor, including some of the new Rapid lines, and this service could have been significantly impacted by the project. However, with the cooperation of our two agencies solutions have been identified and agreed to that will minimize the adverse impact to AC Transit's service.

Enclosed are the minutes from the meeting and the proposed changes to the bid drawings that were discussed and agreed to at the meeting. The implementation of these changes will minimize construction delays to the District's service.

It was agreed that an Addendum Package would be prepared containing the agreed to construction staging drawings changes, as well as necessary changes to provide compatibility of the project's Transit Signal Priority System and Signal Interconnect with the Alameda County CMA SMART Corridor system. It was further agreed that the bid documents would be provided to AC Transit prior to its issuance to prospective bidders in sufficient time for AC Transit to review and comment on the Addendum Package. Please send the Addendum Package to my attention.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

If the minutes or the content of this letter do not agree with your recollection of the meeting, please contact me as soon as possible so that any misunderstandings or misinterpretations of our agreements can be resolved. You may contact me at 510.891.4722.

Again thank you for your efforts to effectively and amicably resolve the District's concerns.

Sincerely,

Zia S. Dairkee
Assistant General Manager – Architecture and Engineering

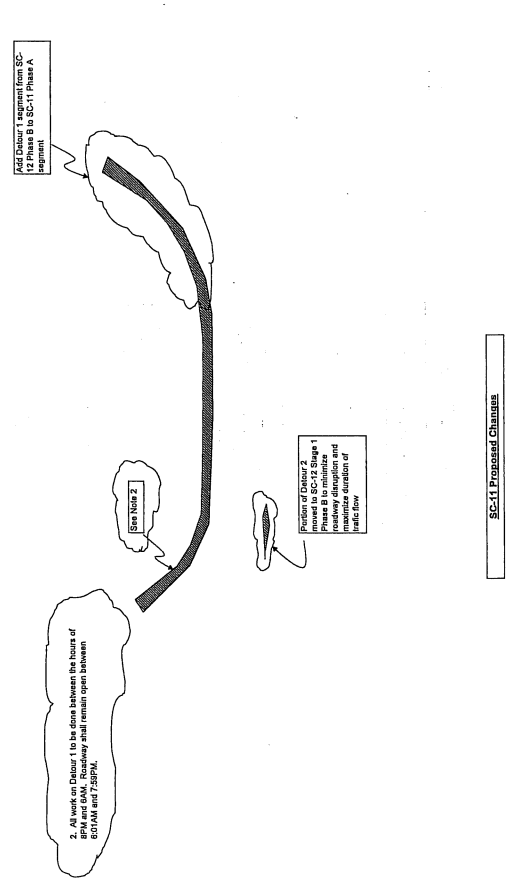
Enclosures: Meeting Minutes (August 22, 2006)
Drawings SC-6, 7, 11, 12 Proposed Changes

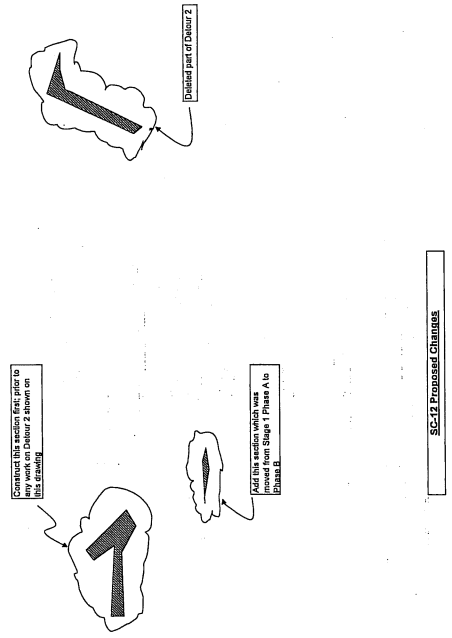
cc: Ade Oluwasogo, City of Oakland Public Works
Joel Peters, City of Oakland
Rick Fernandez, AC Transit, General Manager
Ken Scheidig, AC Transit, General Counsel
Nancy Skowbo, AC Transit, Deputy General Manager for Service Development
Jon Twichell, AC Transit, Manager of Capital Implementation
Greg Hunter, AC Transit, Transportation Manager
Cesar Pujol, AC Transit, Traffic Engineer

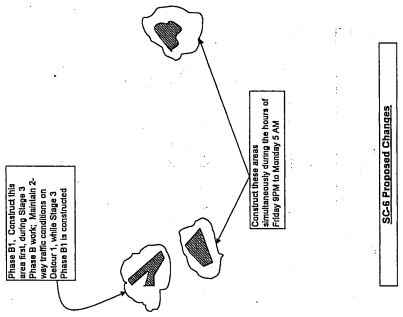
Meeting Minutes
8/22/2006
Discuss Detours on 12th Street Reconstruction Project
Jose Martinez (JM), Ade Oluwasogo (AO), Frank Awayan (FA) w/ City of Oakland
Zia Dairkee (ZD), Greg Hunter (GH), Russ Dibble (RD), Cesar Pujol (CP), Jon Twichell (JT) w/ AC Transit (ACT)

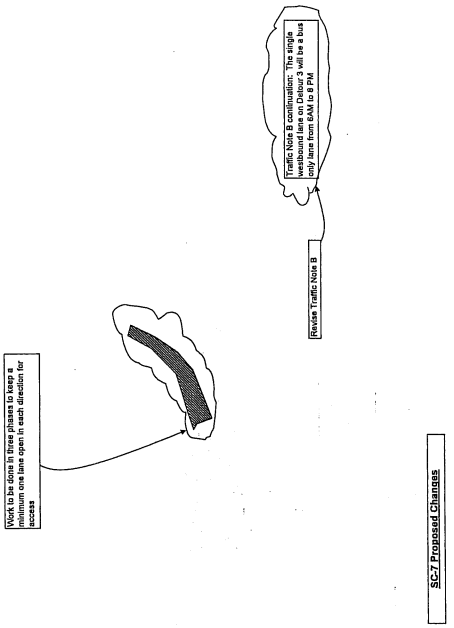
- JM will issue addendum in first week of September. City agreed to give ACT a minimum 3 days to review prior to issuing of the addendum
- There are six construction stages; each stage is approximately 100 days
- See attached shts SC-11 and SC-12 for ACT proposed changes, agreed to by JM. These two shts are preliminary to traffic being diverted onto the long term Detours 1 and 2.
  - Detour 1 runs adjacent to Lake Merritt, while Detour 2 runs adjacent to Oakland Museum/Kaiser Convention Center
  - Closure of Detours 1 and 2 at the same time adversely impact ACT. If either Detour 1 or Detour 2 is temporarily closed, then ACT was acceptable with diverting buses onto the detour that is open. This is preferable to detouring buses onto 10th Street and 2nd Ave. This was accepted in principle by JM.
  - There might be short term night detours or weekend detours where ACT will detour onto 10th Street and 2nd Ave.
- Sht SC-1 Temporary signal light at 12th St/East 12th Street will stay in plans & specifications
  - It's main intended function is to facilitate emergency vehicles and construction delivery trucks
  - AO will reassess need for this temporary signal and may choose not to install
  - If needed then City will provide minimum green for left turn of approximately 5 seconds. This will discourage vehicles from using this signal.
- City will reassess all temporary signal lights for transit impact and may choose not to install
  - For example, Sht SC-5 temporary signal at 13th/14th might not be necessary
- Sht SC-6 Stage 3 Phase B
  - There are three locations identified by Construction Note 1, for contractor to construct transition area from Detour 2 to Detour 3.
    - Detour 1, which is the roadway adjacent to Lake Merritt, will be kept operational in both directions, until the three transition areas are completed
    - These areas will be constructed from Friday 9 PM to Monday 5 AM
    - First location to be constructed should be transition at 13th Street/14th Street.

    - Afterwards, contractor can construct transition at 11th/12th/14th.
- Sht SC-7 Stage 3 Phase C
  - City agreed to not construct Lakeshore cul-de-sac until later stages
  - City also agrees westbound lane on Detour 3 will be bus only.
- Set SC-8 Stage 4
  - All vehicles are now on final roadway, while stage construction entails demolition of detours and construction of park areas.
  - ACT expressed concern that the southside crosswalk at 11th 12th/14th Street would adversely conflict with transit and this conflict may present potential safety issues.
  - JM agreed that southside crosswalk at 11th/12th/14th Street intersection will not be initially delineated and ped signal will not be activated during the construction of the park areas. This provides at least a year to observe the need for a southside crosswalk
- In general, to reduce adverse impact on ACT operations the City will try to do short duration work at night time from 8 PM to 6 AM









Thornton, Elois A

From: David.H.Sulouff@uscg.mil on behalf of Sulouff, David [David.H.Sulouff@uscg.mil]
Sent: Tuesday, January 16, 2007 3:46 PM
To: eathornton@oaklandnet.com
Cc: jerrys@acpwa.org; Eckerle, Tyson S SPN; Hicks, Jane M SPN; Paniccia, Al SPN; Fernwood, Roger A SPN; Dilgren, Richard A SPN; Ramos, Eric LT
Subject: MEASURE DD EIR SCOPING

EstuaryMerrittScopIng0107.pdf ...

Ms. Thornton:
The original of the attached .pdf will be mailed on 17 Jan 2007. Thank you,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
Bldg 50-2 Coast Guard Island
Alameda, CA 94501
(510) 437-3516

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

U.S. Department of Homeland Security
United States Coast Guard

Commander
District Eleven

U. S. Coast Guard Island, Bldg. 50-2
Alameda, CA 94501-5100
Staff Symbol: (dpw)
Phone: (510) 437-3516
Fax: (510) 437-5836

16590
Oak Inner Tidal Canal (5.6)
January 16, 2007

City of Oakland
Attn: Elois A. Thornton
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Madam:

Please include the Coast Guard Bridge Office concerning the Measure DD Environmental Impact Report (EIR) Project, for all bridge related issues over existing or proposed navigable waters of the United States.

The General Bridge Act of 1946 requires that the location and plans for bridges over navigable waters of the United States be approved by the Commandant, U. S. Coast Guard prior to commencing construction. The Oakland Inner Tidal Canal and the Oakland-Alameda Estuary are considered to be navigable waterways of the United States for bridge administration purposes. Coast Guard Bridge permitting is subject to the National Environmental Policy Act.

Lake Merritt and the portion of Lake Merritt Channel upstream from the impoundment are presently not considered navigable for bridge permitting purposes. However, alteration of the waterway to allow vessels to navigate between the lake and the estuary would result in a change to the determination and existing or proposed bridges would become subject to Coast Guard Jurisdiction.

Applications for bridge permits should be addressed to Commander, Eleventh Coast Guard District, Bridge Section, Bldg 50-2, Coast Guard Island, Alameda, CA 94501. Applications are available on-line at: http://www.uscg.mil/hq/g-o/g-opt/g-opt.htm. The application must be supported by sufficient information to permit a thorough assessment of the impact of the bridges and their immediate approaches on navigation and the environment. We recommend discussing the proposed impacts of procedures for constructing, altering or demolishing bridges. The Environmental Impact Statement should also contain data on the number, size and types of vessels using or projected to use the waterway.

We appreciate the opportunity to comment on the project in this early stage. I can be contacted by telephone at (510) 437-3516 if additional information is needed.

Sincerely,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
By direction of the District Commander

Copy: San Francisco Corps of Engineers
CG Sector, San Francisco

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

Maureen F. Gorsen, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

December 21, 2006

Ms. Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for the draft Environmental Impact Report (EIR) for the Measure DD Project (Project) (Case Number ER060017). As you may be aware, the California Department of Toxic Substances Control (DTSC) oversees the cleanup of sites where hazardous substances have been released pursuant to the California Health and Safety Code, Division 20, Chapter 6.8. As a Responsible Agency, DTSC is submitting comments to ensure that the environmental documentation prepared for this project under the California Environmental Quality Act (CEQA) adequately addresses any remediation activities pertaining to releases of hazardous substances.

According to the NOP, the Project would improve or provide new recreational opportunities in the City of Oakland, and improve water quality at Lake Merritt and in creeks located throughout the City. The Project includes the construction of a 6.6 mile segment of the Oakland Waterfront Trail, which will become part of the San Francisco Bay Trail. The proposed trail segment is located between Jack London Square and 66th Avenue. The NOP states that properties along the waterfront designated for parkland development by Measure DD would be acquired and remediated, as needed. A cleanup plan would be developed for each site where soil or groundwater is contaminated above risk-based cleanup standards. These plans would specify measures to be taken to protect workers, the public and the environment during remediation. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency.

For each waterfront property acquired by the City as part of the Project, DTSC strongly recommends an investigation into each property's current and historical uses, and a site assessment to determine whether hazardous substances may have been released into the soil at the site. Based on this information, sampling should be conducted to determine whether there is an issue that will need to be addressed in the CEQA compliance document.

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If hazardous substances have been released, they will need to be addressed as part of this project. For example, if remediation activities at the Site include the need for soil excavation, the CEQA compliance document should include: (1) an assessment of air impacts and health impacts associated with the excavation activities; (2) identification of any applicable local standards which may be exceeded by the excavation activities, including dust levels and noise; (3) transportation impacts from the removal or remedial activities; and (4) risk of public upset should be there an accident at the Site.

DTSC and the Regional Water Quality Control Boards (Regional Boards) signed a Memorandum of Agreement, March 1, 2005 (MOA) aimed to avoid duplication of efforts among the agencies in the regulatory oversight of investigation and cleanup activities at brownfield sites. Under the MOA, anyone requesting oversight from DTSC or a Regional Board must submit an application to initiate the process to assign the appropriate oversight agency. The completed application and site information may be submitted to either DTSC or Regional Board office in your geographical area. The application is available at http://www.calepa.ca.gov/brownfields/MOA/application.pdf.

If you have any questions or would like to schedule a meeting, please contact Allan Fone of my staff at (510)540-3836. Thank you in advance for your cooperation in this matter.

Sincerely,

Denise M. Tsuji, Unit Chief
Northern California - Coastal Cleanup
Operations Branch

cc: Governor's Office of Planning and Research
State Clearinghouse
P. O. Box 3044
Sacramento, CA 95812-3044

Guenther Moskat
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

ALAMEDA COUNTY
CONGESTION MANAGEMENT AGENCY

1333 BROADWAY, SUITE 220 • OAKLAND, CA 94612 • PHONE: (510) 836-2560 • FAX: (510) 836-2185
E-MAIL: mail@accma.ca.gov • WEB SITE: accma.ca.gov

AC Transit
Director
Dolores Jaquez

Alameda County
Supervisors
Nate Miley
Scott Haggerty
Chair

City of Alameda
Mayor
Beverly Johnson

City of Albany
Mayor
Alan Maris

BART
Director
Thomas Blalock

City of Berkeley
Councilmember
Kriss Worthington

City of Dublin
Mayor
Janet Lockhart

City of Emeryville
Mayor
Ruth Atkin

City of Fremont
Mayor
Robert Wasserman

City of Hayward
Mayor
Michael Sweeney

City of Livermore
Mayor
Marshall Kamena

City of Newark
Councilmember
Luis Freitas

City of Oakland
Councilmember
Larry Reid

City of Piedmont
Councilmember
John Chiang

City of Pleasanton
Mayor
Jennifer Hosterman

City of San Leandro
Mayor
Shelia Young

City of Union City
Mayor
Mark Green
Vice Chair

Executive Director
Dennis R. Fay

January 10, 2007

Ms. Elois Thornton
Planner IV
Community and Economic Development Agency
City of Oakland Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

SUBJECT: Comments on the Notice of Preparation for a Draft Environmental Impact Report (DEIR) for the Measure DD Project in the City of Oakland

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Notice of Preparation for a Draft Environmental Impact Report (DEIR) for the Measure DD Project in the City of Oakland. Passed by voters in 2002, Measure DD authorizes the City to issue bonds that fund two types of activities or actions that would provide improved or new recreational opportunities for Oakland's citizens and those that would improve water quality at Lake Merritt and creeks located throughout the City. Major activities funded by Measure DD are: Lake Merritt and Lake Merritt Channel, Oakland Waterfront Trail and Access, East and North Oakland Recreational Facilities and Citywide Creeks. Of the above, activities that may potentially impact the regional transportation network are Lake Merritt Channel improvements and East and North Oakland Recreational Facilities.

The ACCMA respectfully submits the following comments:

- The City of Oakland adopted Resolution No. 69475 on November 19, 1992 establishing guidelines for reviewing the impacts of local land use decisions consistent with the Alameda County Congestion Management Program (CMP). Based on our review of the NOP, the proposed project, particularly the components related to East and North Oakland Recreational Facilities appear to generate at least 100 p.m. peak hour trips over existing conditions. If this is the case, the CMP Land Use Analysis Program requires the City to conduct a traffic analysis of the project using the Countywide Transportation Demand Model for projection years 2010 and 2025 conditions. Please note the following paragraph as it discusses the responsibility for modeling.

- The CMA Board amended the CMP on March 26th, 1998 so that local jurisdictions are now responsible for conducting the model runs themselves or through a consultant. The City of Oakland and the ACCMA have signed a Countywide Model Agreement on March 22, 1999. The Countywide model, updated incorporating ABAG's revisions to the employment data for Projections 2002, is available to the local jurisdictions for this purpose upon request.

- Potential impacts of the project components related to Lake Merritt Channel improvements and East and North Oakland Recreational Facilities on the Metropolitan Transportation System (MTS), including cumulative impacts need to be addressed (See 2005 CMP Figures E-2 and E-3 and Figure 2). The DEIR should address all potential impacts of the project on the MTS roadway and transit systems. These include (1) 14th Street, Harrison Street, 1st Avenue, E.18th and International Boulevard regarding Lake Merritt Channel improvements; and (2) I-880, Hegenberger Road, International Boulevard, San Leandro Street and 98th Avenue as well as BART and AC Transit regarding East and North Oakland Recreational Facilities. Potential impacts of the project must be addressed for 2010 and 2025 conditions.
  - Please note that the ACCMA does not have a policy for determining a threshold of significance for Level of Service for the Land Use Analysis Program of the CMP. Professional judgment should be applied to determine the significance of project impacts (Please see chapter 6 of 2005 CMP for more information).
  - In addition, the adopted 2005 CMP requires using 1985 Highway Capacity Manual for freeway capacity standards.

- The adequacy of any project mitigation measures should be discussed. On February 25, 1993 the CMA Board adopted three criteria for evaluating the adequacy of DEIR project mitigation measures:
  - Project mitigation measures must be adequate to sustain CMP service standards for roadways and transit;
  - Project mitigation measures must be fully funded to be considered adequate;
  - Project mitigation measures that rely on state or federal funds directed by or influenced by the CMA must be consistent with the project funding priorities established in the Capital Improvement Program (CIP) section of the CMP or the Regional Transportation Plan (RTP).

  The DEIR should include a discussion on the adequacy of proposed mitigation measures relative to these criteria. In particular, the DEIR should detail when proposed roadway or transit route improvements are expected to be completed, how they will be funded, and what would be the effect on LOS if only the funded portions of these projects were assumed to be built prior to project completion.

- Potential impacts of the project on CMP transit levels of service must be analyzed. (See 2005 CMP, Chapter 4). Transit service standards are 15-30 minute headways for bus service and 3.75-15 minute headways for BART during peak hours. The DEIR should address the issue of transit funding as a mitigation measure in the context of the CMA's policies as discussed above.

- The DEIR should also consider demand-related strategies that are designed to reduce the need for new roadway facilities over the long term and to make the most efficient use of existing facilities (see 2005 CMP, Chapter 5). The DEIR should consider the use of TDM measures, in conjunction with roadway and transit improvements, as a means of attaining acceptable levels of service.

Thank you for the opportunity to comment on this Notice of Preparation. Please do not hesitate to contact me at 510/836-2560 ext. 24 if you require additional information.

Sincerely,

Saravana Suthanthira
Associate Transportation Planner

file: CMP - Environmental Review Opinions - Responses - 2007

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
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January 10, 2007

ALA000223
SCH#2006122048

Ms. Elois Thornton
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

Measure DD Project, Case #ER060017 – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the environmental review process for the Measure DD Project. The following comment is based on the Notice of Preparation for a Draft Environmental Impact Report.

The U.S. Army Corps of Engineers will be issuing a Section 404 permit for the Lake Merritt Channel Project. Therefore, it is subject to compliance with the National Historic Preservation Act. There is a known prehistoric site that may be within or adjacent to State right-of-way (ROW). Prior to any construction activities within State ROW, the Department's District 4 Office of Cultural Resources will need a copy of the Section 106 cultural resource compliance studies and documentation prior to the issuance of an encroachment permit.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans (in metric units) which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: Michael Condie, Mail Stop #5E.

Should you require further information or have any questions regarding this letter, please call Lisa Carboni of my staff at (510) 622-5491.

Sincerely,

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

"Caltrans improves mobility across California"

STATE OF CALIFORNIA Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

January 9, 2007

Elois Thornton
City of Oakland
250 Frank H. Ogawa Plaza Suite 3315
Oakland, CA 94612

RE: Measure DD Project, SCH# 2006122048

Dear Mr. Thornton:

As the state agency responsible for rail safety within California, we recommend that any development projects planned adjacent to or near the rail corridor in the City be planned with the safety of the rail corridor in mind. New developments may increase traffic volumes not only on streets and at intersections, but also at at-grade highway-rail crossings. This includes considering pedestrian circulation patterns/destinations with respect to railroad right-of-way.

Safety factors to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to increase in traffic volumes and appropriate fencing to limit the access of trespassers onto the railroad right-of-way. Any project that includes a modification to an exiting crossing or proposes a new crossing is legally required to obtain authority to construct from the Commission. If the project includes a proposed new crossing, the Commission will be a responsible party under CEQA and the impacts of the crossing must be discussed within the environmental documents.

Specific concerns include the proposal to build a bicycle/pedestrian path along the Lake Merritt channel which includes a crossing of the Union Pacific Railroad mainline. This crossing must be grade-separated. Bicycle/pedestrian improvements are also needed at the rail crossing at 5th and Embarcadero.

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Terrel Anderson, Union Pacific Railroad

EAST BAY REGIONAL PARKS PARK DISTRICT
PARKS FOR THE FUTURE

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January 5, 2007

Eloise Thornton
Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: City of Oakland, Measure DD Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR), Case Number ER060017

Dear Ms. Thornton:

East Bay Regional Park District ("District") has received the NOP for the DEIR for the Measure DD Project and would like to make the following comments. The District's existing parks and trails under District maintenance and management in the Measure DD project area include the Martin Luther King Jr. Regional Shoreline Park, a 1,220-acre park leased from the Port of Oakland, and the paved multi-use San Francisco (SF) Bay Trail within the Park, which extends from Hegenberger Avenue to less than a quarter mile south of the High Street Bridge. The District also manages and maintains the 66th Avenue Staging and connector trail to the SF Bay Trail from Zhone Way.

Regarding the Oakland Waterfront Trail and Access proposed project boundaries, the District currently operates and maintains the SF Bay Trail from 66th Ave. north to the East Creek Point at Tidewater. In order to complete a trail link from this location to the High Street Bridge, the District is currently evaluating the potential for a non-motorized bicycle and pedestrian inland route along Tidewater Rd. to connect with the High Street Bridge. The project would include a signalized crossing of the Bridge intersection which would allow trail users a safe north-south crossing location. This segment would transition to the existing City of Oakland segment of trail on the north side of the bridge. The Boathouse is also a part of the Tidewater project which includes a segment of SF Bay Trail along the property's frontage with the Bay. The City of Oakland proposed access and overlook improvements at 66th Avenue will require review and approval by the District.

Regarding the proposed Oak to Ninth Development plan, a quality public access plan for the shoreline would include a well-designed SF Bay Trail segment across the development site.

Thank you for the notice of preparation and opportunity to provide scoping comments for the DEIR. Should you have any additional comments, please do not hesitate to call me at (510) 544-2611

Sincerely,

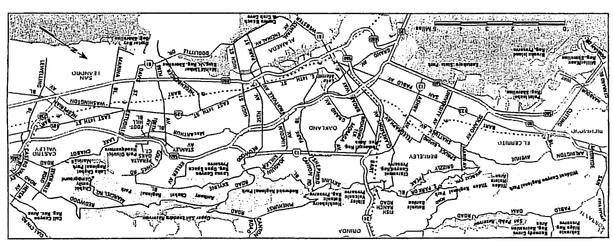
Jamie Perkins
Senior Planner, Regional Trails Department

cc: Lee Huo, SF Bay Trail

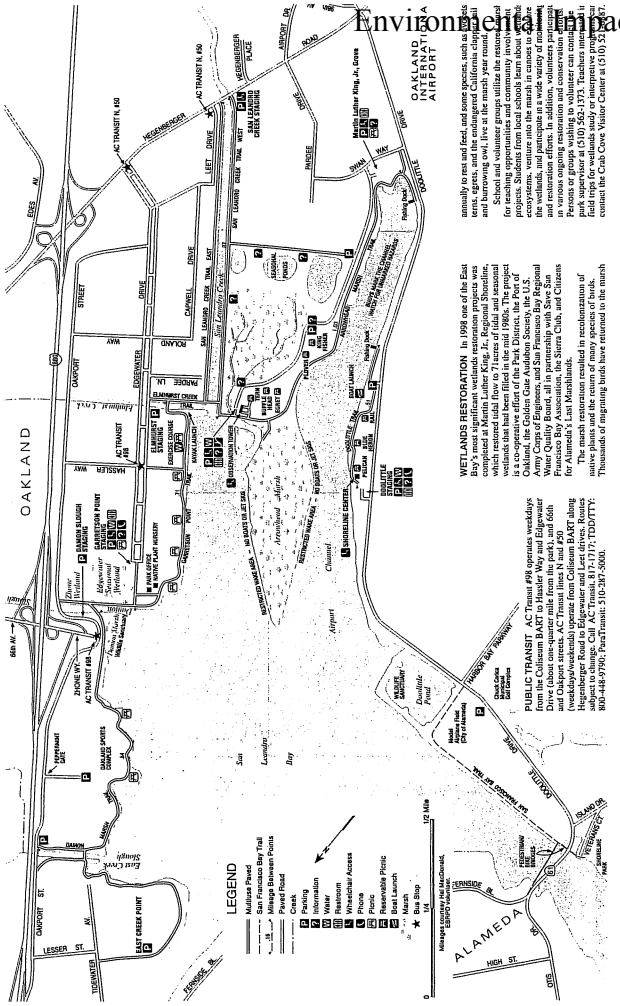
2950 Peralta Oaks Court P.O Box 5381 Oakland, CA 94605-0381
TEL 510 635-0135 FAX 510 569-4319 TDD 510 633-0460 www.ebparks.org

MARTIN LUTHER KING, JR. REGIONAL SHORELINE

EAST BAY REGIONAL PARK DISTRICT



PARKLAND RULES



EAST BAY MUNICIPAL UTILITY DISTRICT

December 29, 2006

Elois Thornton, Planner IV
City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: Notice of Preparation of a Draft Environmental Impact Report – Measure DD Project, Oakland

Dear Ms. Thornton:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report (EIR) for the Measure DD Project in the City of Oakland (City). EBMUD has the following comments.

WATER SERVICE

EBMUD's Central and Pressure Zone, with a service elevation range of 0 to 100 feet, and Aqueduct Pressure Zone, with a service elevation range of 100 to 200 feet, serve the area incorporated in the Measure DD Project. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine the costs and conditions of providing water service to the project. Engineering and installation of water mains and services requires substantial lead time, which should be provided for in the project sponsor's development schedule.

WASTEWATER

EBMUD's Main Wastewater Treatment Plant is anticipated to have adequate dry weather capacity to treat the proposed wastewater flow from the projects included in Measure DD, provided this wastewater meets the standards of EBMUD's Environmental Services Division. However, the City's Infiltration/Inflow (I/I) Correction Program set a maximum allowable peak wastewater flow from each subbasin within the City and EBMUD agreed to design and construct wet weather conveyance and treatment facilities to accommodate these flows. EBMUD prohibits discharge of wastewater flows above the allocated peak flow for a subbasin because conveyance and treatment capacity for wet weather flows may be adversely impacted by flows above this agreed limit. The developers for these projects need to confirm with the City's Public Works Department that there is available capacity within the subbasin flow allocation and that it has not been allocated to other developments. The projected peak wet weather wastewater flows from

this project need to be determined to assess the available capacity within the subbasin and confirmation included in the environmental documentation. Suggested language to include in the environmental documentation is as follows: "The City of Oakland Public Works Department has confirmed that there is available wastewater capacity within Subbasin (insert subbasin number here) that is reserved for these projects."

In general, each project should address the replacement or rehabilitation of the existing sanitary sewer collection system to prevent an increase in I/I. Please include a provision to control or reduce the amount of I/I in the environmental documentation for this project. The main concern is the increase in total wet weather flows, which could have an adverse impact if the flows are greater than the maximum allowable flows from this subbasin.

It should also be noted that EBMUD's San Antonio Creek (SAC) Wet Weather Facility, SAC dechlorination facility, SAC discharge line and South Interceptor are located by the Lake Merritt Channel near the outlet to the estuary. The two pipelines run along Embarcadero and are above-ground as they cross the channel. The Oakland Waterfront Trail appears to run along side EBMUD's Oakport Wet Weather Facility and the SAC dechlorination facility. The Oakport facility is used to treat wet weather flows and serves as an equipment storage area. The existing Oakport and San Antonio Creek facility usages should be kept in mind when evaluating the visual impact along the trail. Any work in these areas should be coordinated with EBMUD.

WATER RECYCLING

EBMUD's Policy 8.01 requires that customers use non-potable water for non-domestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant life, fish and wildlife to offset demand on EBMUD's limited water supply.

In March 2002, the City adopted a dual plumbing ordinance, requiring new developments within the City to use recycled water provided by EBMUD and install separate plumbing systems for appropriate recycled water uses if recycled water will be available. The 12th Street Reconstruction component in the Lake Merritt and Lake Merritt Channel group of the City's Measure DD Project is located within the service area boundary of EBMUD's East Bayshore Recycled Water Project. EBMUD anticipates recycled water delivery to the 12th Street Reconstruction project area by mid 2007 and recommends that the City coordinate and consult with EBMUD regarding the installation of separate plumbing systems for use of recycled water for landscaping irrigation through the project area.

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD would request that the City include in its conditions of approval a requirement that the project sponsor comply with the Landscape Water Conservation Section, Article 10 of Chapter 7 of the Oakland Municipal Code. EBMUD staff would appreciate the opportunity to also meet with applicant's staff. A key objective of this discussion will be to explore timely opportunities to expand water conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:TNS:sb
sb06_478.doc

January 3, 2007

Dear Planning Commissioners,

I am writing on behalf of the "No Clear Cut Group." We are a citizen advocacy group that was created in November 2005 to advocate for the saving of mature Lake Merritt trees threatened by the DD plans. We are submitting to you suggestions that should be included in the general scope of the new EIR.

Not only do we have concerns, but as you will see, we have provided possible alternatives for your consideration.

Our comments are not limited to trees. We have positive suggestions for the Lakeshore configuration, jogging paths, bike paths, the channel and the Embatcadero street closures.

We appreciate your consideration in this matter.

Sincerely,

Nancy Rieser

Nancy Rieser
"No Clear Cut" Group
437 Euclid Ave #10
Oakland, CA
510-465-0928

PAGE 03

A. EVALUATION OF THE LAKE MERRITT TREES:

It is clear that the City, as part of the EIR process HAS to HIRE a qualified arborist who can do a comprehensive, independent evaluation which should include but not be limited to:

- Alternatives to the removal of trees for the convenience of contractors and/or inflexible landscape designers
- Recommendations for mitigative practices that both protect the health of the tree during construction and enhance its overall health and live span
- In additional to tree health analysis, the arborist should also calculate the economic and environmental value of the existing trees, to include, but not be limited to:
  - prevention of soil erosion and water run-off
  - improvement of water quality
  - removal of air pollution particulates and carbon dioxide emissions
  - economic enhancement of local property values

These economic and environmental values can easily be calculated using methods developed by UC Davis' Department of Urban Forestry and which are commonly used by municipalities and universities across the United States and Canada.

It is important to note, that the City did not do this important process in its last EIR. One week AFTER the City Council denied our tree permit appeal (late June of 2006) one of our Clear Cut members finally reached professional arborist by phone, Professor Louis Costello, whom the City claimed to have hired to evaluate the Lake Merritt trees. Professor Costello works at UC Davis in the Department of Urban Forestry.

Professor Costello stated he never wrote a report for the City and only had a relatively brief, informal walk-through (one hour) and saw a limited number of Lake Merritt trees. The second hour he spent in another part of the City, looking at the Dimond Park Champaign Oak Tree. He did not advise cutting any Lake Merritt trees unless they were clearly dead. (The dead trees around Lake Merritt of were very limited in number (a handful.)

However this current staff report still maintains that the trees are diseased and/or are at the end of their life spans, despite the lack a formal evaluation and report. This lack of science based evidence needs to be rectified.

B. REDESIGN OF BIKE PATHS:

Explore alternate path designs for recreational users (as opposed to those who would use the street bike lane. In community meetings and in Letters to the Editor, bicycle group representatives objected to any path that would sacrifice trees and instead supported the idea of a curving bike path design. We concur and further believe that a new design that allowed bikers to meander gently around trees would:

- make recreational biking through the park a more aesthetically pleasing experience
- slow down the speed of recreational bikers who share the park with other users
- echo the existing historical park design
- protect the existing heritage trees

C. JOGGING PATH ALONG LAKESHORE: Consider preserving the informal jogging path that currently seems to adequately meet the needs of joggers who don't run next to the water or who need to jog around the occasional walker on the sidewalk.

The City's lack of awareness of this existing path may be the explanation behind it's posting of the DD Park Improvement sign in the middle of the path.

Joggers who prefer high speed running and find navigating around an occasional sidewalk pedestrian an impediment to their sport, usually use choose to use running tracks at nearby high schools and community colleges.

D. REDESIGN OF LAKESHORE AVENUE: The Plan of redesigning Lakeshore Avenue needs to look at alternatives that take the viewpoint of residents and park users – not just the bicyclists and motorists.

The Lakeshore re-configuration presumes that all pedestrian/car conflicts are due to speed alone. *This is not true.*

Pedestrians who use the unsignaled crosswalks at Boden Way, in front of Our Lady of Lourdes Church complain of difficulty crossing the street due to motorists not stopping or slowing down ***unless a stop light or caution light tells them to do so.*** Pedestrians further up Lakeshore near the Lake Merritt United Methodist Church complain of the lack of signalized crossings.

This problem can be easily corrected by the use of push button operated, yellow-flashing, "pedestrian caution" lights. There are models that are solar powered, use LED lights, are easy to install and are low maintenance. Further, the initial purchase costs of these safety signs are inexpensive compared to standard street lights (models usually run only $3,000) and only would be operated as needed.

This safety addition would NOT impact the proposed Lakeshore re-configuration and/or proposed bike lanes. It simply provides pedestrians a means to alert drivers who are not mindful of crosswalks and/or who may be distracted.

E. THE CHANNEL: HOW NAVIGABLE DOES IT NEED TO BE? WHERE SHOULD THE WETLANDS RESTORATION PROJECT BE LOCATED?

The planning commission is already aware of fairly serious easement issues with Union Pacific, EBMUD, BART, Alameda County Flood Control District and Port of Oakland. On top of the right-of-way issues, there is the mind-numbing expense of making the Flood Control station into something more user friendly for a small number of recreational boaters.

We say small number, because the close proximity of the high tidal waters the two Railroad trestles, Port of Oakland jet fuel lines and the EBMUD high pressure sewer lines make the passage of any vessel with a mast impossible. Only kayakers and operators of very small boats without sails can cautiously pass under the RR trestles – and can only do so if they duck. (See attached photos.)

The tidal changes severely limit water passage for boaters. At regular high tide, one can float from the lake down the channel. However, at extreme high tides the water covers the RR trestles. At low tide, much of the channel is ankle deep – or in some spots – just a series of puddles at severe low tide. It can't be dredged to be made deeper, either. The BART tube to Fremont runs underneath the channel near Laney college. At low tide, a person can actually stand on the outside/top of the BART tube (see photo).

Does the channel need to be "accessible" 24/7? No, say experience kayakers. They understand tide tables and plan accordingly.

The biggest impediment is NOT the flood gates. They open and close and for the most part stay open unless a predicted severe storm will collide with a high tide.

The big impediment is the garbage grilles on either side of the floodgates. No one is arguing that garbage should not be collected or caught in some fashion. Could the answer be as simple as examining whether the serious underwater grilles are now redundant?

RECOMMENDATION: Now that we have creek catchment/control systems up stream that probably are sufficient to block submerged logs from the watershed from floating down stream (and potentially out into the harbor to damage boats) perhaps we could consider removing the stationary grilles and replace them with movable/cleanable net system that can collect the usual flotsam and jetsom and allow period passage of small boats. Creating a side channel may be possible, but extremely expensive in that it will need its own set of flood gates, according the Alameda County Flood Control District.

F. MARSHLAND RESTORATION: THE EIR SHOULD EXAMINE ALTERNATE SITES IN THE CHANNEL AND THEREBY SAVE THE STAND OF REDWOODS

Previously, the channel in front of Laney College was a vibrant marshland that was used by the Science Department of the Oakland Museum as a living science lab. Even though the original channel was actually the width of Lake Merritt and much of it is covered over by the Convention Center, Laney College and the Museum of California, what was left over eventually became a verdant marshland.

The native pickle grass was other vegetation was pulled out and replaced with ornamental ice plant over and above the protestations of the local biologists. Ironically, the tearing out of the natural marshland was funded by....a bond measure. Now what is left in that location is ice plants and mudflats.

The City has approached an independent agency for a grant to restore marshland in an area that is now built up with bay fill. At risk are a stand of Redwood trees that provide nesting sites to protected raptors further up the channel next to the lake. Not only is this site not desirable in light of the threat to the native trees, but biologists wonder if the older fill dirt in that area actually has the organic components to support marshland restoration.

Why not move the marshland restoration project down to the area where marshland was ripped out by the city 25 years ago? We know the mud has the organic compounds necessary for the plants. That part of the channel does not need to be dredged nor or does its banks to be sloped or carved. With this bond measure money, we can fix a past mistake AND deliver the project at the foot of the Laney College Science Department that has expressed an interest in collaborating in this restoration matter.

G. Alternate street closure plans for the Green Link park expansion plan.

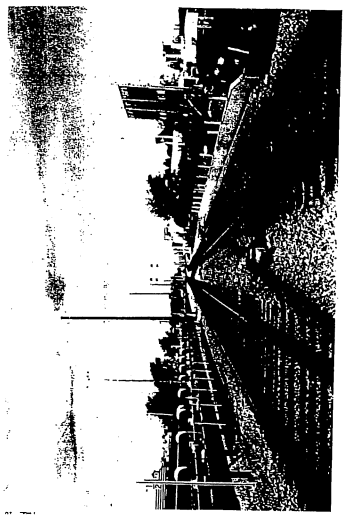
The current plans were created without input from the Library staff or patrons. The proposed street closure will double the traffic, noise and pollution under the Library windows. The negative conditions have been objected to by both library staff and the Friends of the Lakeview Library in the form of letters, one-on-one meeting with council members and in front of the entire City Council. However, the City, thus far, has not budged from its position nor expressed regret that input from the one user group most negatively impacted was not sought out and incorporated into the planning process.

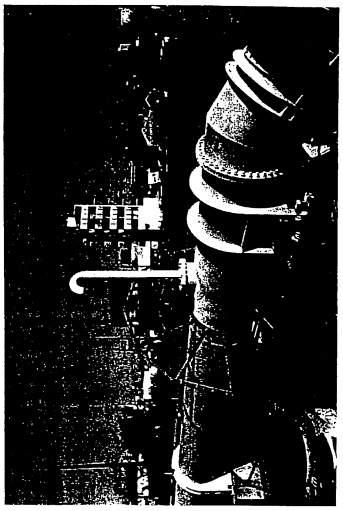
We feel that the EIR should examine at least two more options:

1. Closing the leg of the Embarcadero closest to the library instead of closest to the lake instead of the one closest to the library.

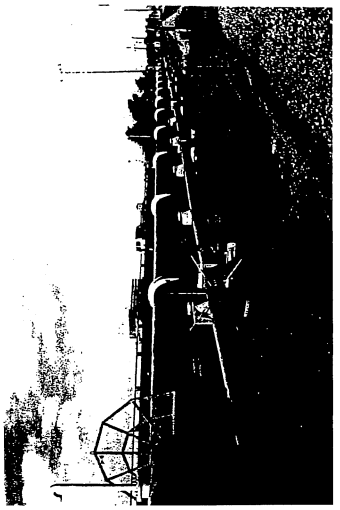
2. Keeping both legs of Embarcadero open Monday through Friday (avoiding commuter headaches) yet closing both legs *at the same time* on the weekends, much like Kennedy Drive in San Francisco's Golden Gate Park. This option would create a completely car-free zone for two days a week -- the weekend, which is the time when the park is used the most.

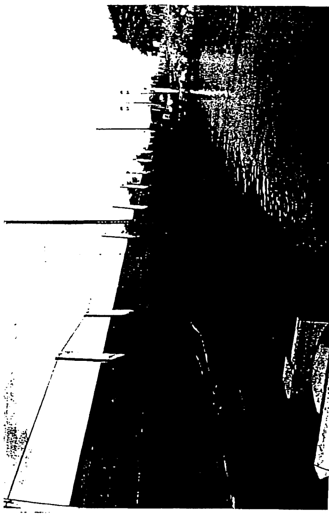
EBMUD high pressure sewer lines, RR trestle...jet fuel lines running from the Port to the Airport are just a foot off the water at high tide and at extreme high tides the water actually reaches the utilities.

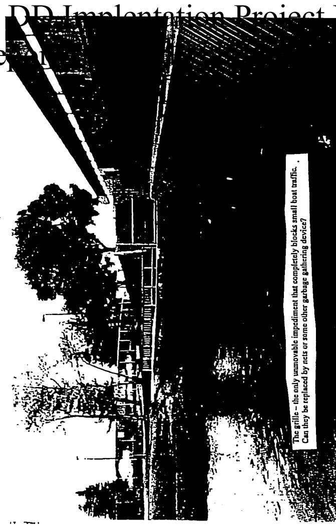


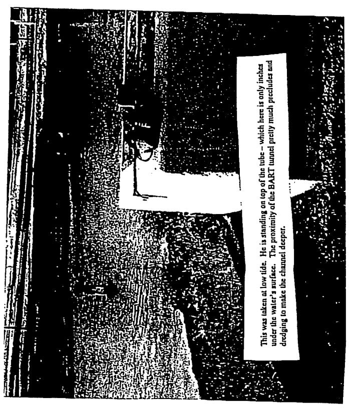


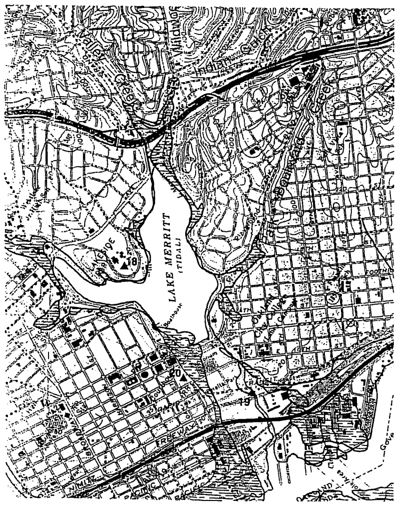
EB MUD

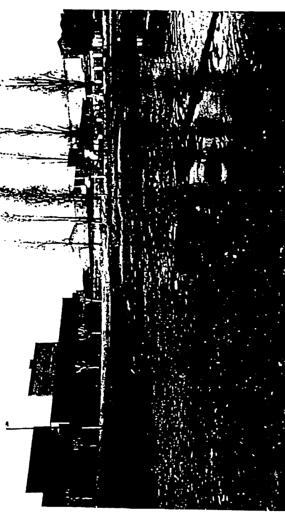


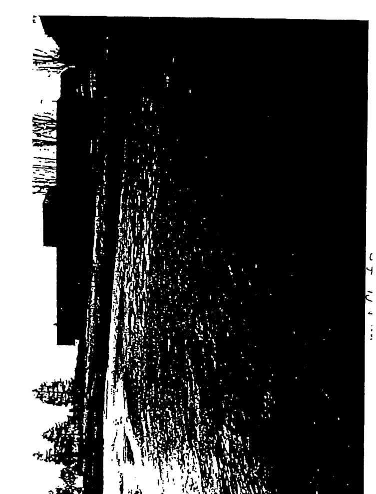












Thornton, Elois A

From: Mary Eileen Farrell [mepf@pacbell.net]
Sent: Tuesday, January 23, 2007 1:33 AM
To: eathornton@oaklandnet.com; dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com; gofindnancy@yahoo.com
Subject: Measure DD Impact on Lakeview Library

Hello,

This email is to let you know that if the El Embarcadero streets are changed the way that Measure DD plans, the noise and air pollution will be increased for the public and staff at Lakeview Branch Library.

People from the library were not included in the original public discussions on these changes and did not know until the city was ready to implement the changes, that the road configuration would be changed. The library had no input into Measure DD decisions.

Currently the traffic is so noisy that programs are interrupted. Windows have to be open for ventilation. The prevailing breezes come from Lake Merritt into the library bringing noise and air pollution into the library.

Once the changes are implemented, four lanes of traffic will be compressed into three lanes and moved two feet closer to the library. There will be two stop lights at either end of El Embarcadero, causing traffic to idle while stopped, causing air pollution and noise pollution to be concentrated right in front of the front door of the library.

The library conducts children's and adult programs in the space in front of our front door. Concentrating all the traffic into three lanes and moving them two feet closer to our front door can put library patrons in jeopary.

With the traffic concentrated in this fashion, it will be more difficult for pedestrians to cross to our library. Over 1/2 of Lakeview's patrons are pedestrians.

We urge the Planning Commission to reconsider this part of the Measure DD plan.

Alternate choices could be:

Consolidate the traffic and put it on the branch of El Embarcadero which is closer to the lake,

or

Make all the space between the library's front door and the lake green space,

or (the most cost effective plan)

Leave the roads as they are and block them to traffic

on weekends, making the two branches of El Embarcadero public, pedestrian and assembly spaces on weekends.

Thank you for considering these comments.

Mary Farrell

Thornton, Eloi s A

From: mattmcfarland@earthlink.net
Sent: Monday, January 22, 2007 4:52 PM
To: eathornton@oaklandnet.com
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; amudge@coxcastle.com; mlighty@calnurses.org; mzm@ionix.net
Subject: Comments on Measure DD Project NOP

Measure DD omment Letter.pdf

Dear Ms. Thornton,

Please find attached Comments on the Notice of Preparation for the Measure DD Project. The comments are submitted by Friends of the Lake, David Mix, Gloria Pieretti and Therese George.

Thank you for allowing the public the opportunity to comment.

very truly yours,

Matt McFarland
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA 94105
(415) 442 - 0711 Phone
(415) 442 - 0713 Fax

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LAW OFFICES OF BRIAN GAFFNEY

605 Market Street, Suite 505 **(415) 442-0711 Phone**
San Francisco, CA 94105 **(415) 442-0713 FAX**

FAX MEMO

TO: Eloise Thornton, Fax: (510) 238-6538
DATE: January 22nd, 2007
RE: Comments on Notice of Preparation for the Measure DD Project.
PAGES TO FOLLOW: 7

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LAW OFFICES OF BRIAN GAFFNEY

605 Market Street, Suite 505, San Francisco, CA 94105
(415) 442- 0711 Phone **(415) 442-0713 Fax**

January 22, 2007

Via Facsimile and Electronic Mail

Eloise Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA. 94612
facsimile: 510-238-6538
eathornton@oaklandnet.com

RE: Comments on Notice of Preparation for the Measure DD Project

Dear Ms. Thornton,

This office represents Friends of the Lake, David Mix, Gloria Pieretti and Therese George (collectively "Friends of the Lake") regarding the Notice of Preparation ("NOP") for the proposed Measure DD project. On August 7, 2006, Friends of the Lake filed suit against the City of Oakland ("the City") in the Alameda Superior Court. The action challenged the failure of the City to conduct proper environmental review with respect to the granting of three Tree Removal Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006). The action also challenged the certification of the Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR"), which avoided discussion of tree removal impacts and failed to adequately analyze the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. Because the Measure DD project includes Lake Merritt Channel alterations that will result in the removal of protected trees, Friends of the Lake submits these comments.

The City's previous decision to grant the three Tree Removal Permits is contradicted by substantial evidence in the record, did not follow the procedure required by California Environmental Quality Act ("CEQA"), and was not supported by adequate Findings as required by CEQA and California Code of Civil Procedure section 1094.5. In addition, the City's reliance on the June 2002 Measure DD Initial Study ("Initial Study") prior to granting the Tree Removal Permits is improper as the Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

Likewise, the City failed to proceed in the manner required by law when certifying the Lake Merritt Channel Wetlands and Widening Project EIR. The EIR (1) fails to accurately describe the project as including the removal of all trees authorized by the Tree Removal Permits; (2) fails to include an accurate project description or to adequately describe the environmental setting; and (3) fails to make

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

adequate findings with respect to each significant effect identified by the EIR. Specifically, the findings are inadequate as they do not explain how proposed mitigations will mitigate the channel widening project, do not explain why the facts in the record support the proposed mitigations, do not provide a logical explanation establishing the relationship between the findings and the evidence, and are not supported by substantial evidence.

Further, the EIR fails to adequately analyze the Channel Wetland and Widening Project's significant environmental impacts—including an inadequate analysis of cumulative impacts. In addition, there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts. The EIR also fails to adequately analyze alternatives and improperly tiers to the 2002 Initial Study.

Finally, in granting the Tree Removal Permits and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

In preparing the Draft EIR for the Measure DD project, Friends of the Lake encourages the City to engage in proper environmental review so as to avoid the failures inherent in both the previous granting of the Tree Removal Permits and the certification of the Lake Merritt Channel Wetlands and Widening Project EIR. Filing of the above-mentioned action, Friends of the Lake believes, was a catalyst for the initiation of the Measure DD EIR noticed by the NOP. Hopefully, the City will now correct the previous deficiencies.

Please continue to include both this office and Friends of the Lake, in any further communications to the public on this proposed project. Thank you for affording the public this opportunity to comment.

Sincerely,

Matt McFarland

cc: Friends of the Lake
Doug Boxer (dboxer@gmail.com)
Michael Colbruno (michaelcolbruno@clearchannel.com)
Suzie Lee (suzie@yhla.net)
Michael Lighty (mlighty@calnurses.org)
Anne Mudge (amudge@coxcastle.com)
Madeleine Zayas Mart (mzm@ionix.net)

Thornton, Elois A

From: Nancy Rieser [gofindnancy@yahoo.com]
Sent: Monday, January 22, 2007 5:43 PM
To: Nancy Rieser; eathornton@oaklandnet.com; Gloria Pieretti
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Subject: Re: PDF of lawsuit

Dear Ms. Thornton and Commissioners:

I thought I would just add one suggestion to the Kayaking issue and boat access in my previous packet I submitted a two weeks ago.

1. CUTTING THROUGH A SOFT CUBE OF BUTTER WITH A CHAIN SAW:

In more conversations with boaters I learned that this is what Kayakers and river rafters do who face any impediment in a stream, river or channel that their boat cannot navigatge through (such as heaps of bolders, waterfalls or excessively low stretches of water): they simply lift up their lightweight, water craft....and walk around the impediment and, once on the other side, they drop their boat in the water and off they go. The word they use is "portage".

So my question is...why can't kayakers do the same around the pump station? I refer you to one of the photos in the packet sumitted to the Commission a two weeks back. It is of the gentleman standing in the middle of the channel on top of the BART tube, ankle deep in water. Between him and the large concrete block where his shoes are resting is a gently sloping bank. He walked down there in his bare feet.

That piece of bank in the EXACT part of the bank where kayaking portage would occur. Out of the picture frame, immediately to the left, is the pump house.

One wouldn't have to even construct a path.

So it seems that building a by pass channel AND a separate set of flood gates to let the (very) occasional kayaker float through is insanely expensive and over the top.

Kayakers know how to portage. Let them walk around the pump house as if it was a big pile of rocks.

2. THE GARBAGE GRILL APPARENTLY NEEDS TO STAY PUT

It catches the flotsam and getsam that would get into the pump house machinery. However, there are spaces between the forks underneath the water to allow big fish through (every other tong was removed for that purpose.) It's not big enough to allow a harbor seal to get through or a great white shark, but is ample for the larger fish, which in fact, have been caught in the lake in times past, when fishing was allowed.

The new EIR should reflect some kind of consensus from the professional,

1/23/2007

experienced boating community as to the most practical and econonomic way for making the channel accessible to kayakers.

Respectfully submitted,

Nancy Rieser
437 Euclid Ave #10
Oakland, CA 94610

----- Original Message -----
From: Nancy Rieser <gofindnancy@yahoo.com>
To: eathornton@oaklandnet.com; Gloria Pieretti <gpieretti@sbcglobal.net>
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Sent: Monday, January 22, 2007 4:42:19 PM
Subject: Fw: PDF of lawsuit

Dear Ms. Thorton,

I am submitting this on behalf of Gloria Pierett, whose computer is not cooperating with her today! She was able to send this letter to me before all heck froze.

She is a collegue of mine in the Merritt Lakesiders and the No Clear Cut Group and is at the core of the Friends of the Lake Lawsuit which inspired the City to start the EIR process from scratch. Her letter is below and the lawsuit is appended as an attachment. She would like the entire lawsuit (21 pages) to be part of the record.

I will be hand delivering a hard copy of the letter and the attachment to the Planning Department momentarily.

Nancy Rieser

Nancy Rieser

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

Dear Ms. Thornton

As a concerned citizen who has lived in Oakland across the street from Lake Merritt for 27 years, I APPLAUD YOUR ACTIONS AND THOSE OF THE CITY FOR INITIATING A NEW EIR FOR MEASURE DD WHICH WILL INCLUDE A REPORT BY A CERTIFIED ARBORIST!

I, along with a majority of Oakland voters, cast my vote in favor of Measure DD without knowing all the details. I was shocked to learn that mature trees surrounding the Lake Merritt area and the redwoods along the channel were to be cut. Additionally, it alarmed me further to learn that the lawn in front of boathouse was to become a parking lot.

Enclosed is a complete copy of the lawsuit submitted by Attorney Brian Gaffney on behalf of Friends of the Lake . Please include it as part of the official record.

Thank you for your consideration in correcting the OMISSIONS OF THE PREVIOUS EIR.

Sincerely,

Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

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Date: Monday, January 22, 2007 4:42:19 PM
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http://us.f528.mail.yahoo.com/dc/launch?.rand=etbcsagu129m5 1/22/2007

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

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chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

Brian Gaffney (CSB 168778)
Matt McFarland (CSB 225537)
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA. 94105
Telephone: (415) 442-0711
Facsimile: (415) 442-0713

For Petitioners/Plaintiffs

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF ALAMEDA

FRIENDS OF THE LAKE, DAVID MIX, GLORIA PIERETTI, and THERESE GEORGE

Petitioners and Plaintiffs,

vs.

CITY OF OAKLAND, and DOES 1 through 20, inclusive,

Respondents and Defendants.

CASE NO.:

PETITION FOR WRIT OF MANDATE AND COMPLAINT FOR INJUNCTIVE AND DECLARATORY RELIEF

By Petition and Complaint, Petitioners and Plaintiffs Friends of the Lake, David Mix and Gloria Pieretti (hereinafter "Petitioners") allege as follows:

INTRODUCTION

1. Petitioners, in bringing this action, challenge the failure of the City of Oakland (collectively "City" or "Respondents") to conduct proper environmental review of significant proposed changes to Lake Merritt, including the removal of over 225 trees from and the alteration of the Lake Merritt channel. The City's actions are illegal as they violate the California Environmental Quality Act, Public Resources Code section 21000 *et seq.* ("CEQA") and the California Code of Regulations, Title 14, section 15000 *et seq.* ("CEQA Guidelines").

2. On or about June 7, 2006, the City granted 3 Tree Removals Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006 (hereinafter collectively "the Approvals") without evaluating the significant adverse impacts of cutting over 225 trees surrounding the shores of Lake Merritt.

3. Subsequently, on or about July 5, 2006, the City certified a seriously flawed Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR") which avoided discussion of the impacts of cutting over 225 trees around Lake Merritt, and inadequately analyzed the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. In reliance on the inadequate EIR, the City approved the Lake Merritt Channel Wetlands and Widening Project ("the channel widening project").

4. In addition, the City's approvals of Tree Removal Permits and a channel widening project which will remove trees that contain nests of birds of prey in the order Falconiformes and Strigiformes violate Fish and Game Code section 3503.5.

5. The City's actions will harm Petitioners, their members and the public, in that environmental values will be degraded and the Lake Merritt project area will be permanently altered—without the environmental review required by law.

PARTIES

6. Petitioner and Plaintiff Friends of the Lake ("Friends") is an unincorporated non-profit association formed after the City granted the Approvals and certified the EIR. Friends is an

alliance of individuals interested in protecting and improving Lake Merritt in Oakland, California, particularly the trees, waters and environs surrounding Lake Merritt. Friends provides a forum for local residents to be involved with Oakland neighborhood developments and to interact with the City government about neighborhood concerns, including proper City planning. Members of Friends—including citizens, taxpayers, property owners and residents—live and work near Lake Merritt, and use and enjoy Lake Merritt for aesthetic, recreational, scientific and social purposes. Friends and its members have a long-standing concern for the project area.

7. Members of Friends submitted comments in writing and verbally to the City of Oakland, *inter alia,* urging the City not to grant the Tree Removal Permit approvals. Members of Friends submitted comments in writing and verbally to the City of Oakland raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Lake Merritt Channel Wetlands and Widening Project. Members of Friends submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

8. Petitioner and Plaintiff David Mix is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. David Mix uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. David Mix is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. David Mix submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. David Mix submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

9. Petitioner and Plaintiff Gloria Pieretti is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Gloria Pieretti uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Gloria Pieretti is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Gloria Pieretti submitted comments, *inter alia*, to the City urging the City not to

grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Gloria Pieretti submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

10. Petitioner and Plaintiff Therese George is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Therese George uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Therese George is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Therese George submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Therese George submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

11. Because Petitioners are interested in proper environmental and land use planning within the City of Oakland, particularly regarding Lake Merritt and the surrounding vicinity, Petitioners have a direct and beneficial interest in the City's compliance with CEQA and the CEQA Guidelines.

12. Petitioners therefore will suffer concrete, actual and imminent injury from Respondents' abuse of discretion in failing to comply with CEQA in granting the Approvals and certifying the EIR.

13. Respondent and Defendant City of Oakland is a city organized under the laws of the State of California. The City is responsible for the formulation and implementation of land use planning in the City of Oakland, including compliance with CEQA and the CEQA Guidelines, grant or denial of Tree Removal Permits, certification of Environmental Impact Reports and determining if projects are exempt from CEQA. The Oakland City Council is the City's elected body that granted the Approvals and certified the EIR.

14. Petitioners are unaware of the true names and capacities of Respondents and Defendants DOES 1 through 20, inclusive, and therefore sues said Respondents and Defendants

under fictitious names. Petitioners will amend its Petition and Complaint to show their true names and capacities when the same have been ascertained. Each of the Respondents and Defendants is the agent and/or employee of each other Respondent and Defendant, and each performed acts on which this action is based within the course and scope of such Respondent and Defendant's agency and/or employment. Petitioners are informed and believe and therefore allege that each Respondent and Defendant is legally responsible in some manner for the events and happenings referred to herein.

STATEMENT OF FACTS

Tree Removal Permits

15. In June 2002, the City released an Initial Study (hereinafter "2002 Initial Study") for all projects associated with proposed Measure DD, then known as the Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure. The 2002 Initial Study purported to review the potentially significant environmental impacts of, *inter alia*, 1) the 12th Street Reconstruction Project, 2) the Lakeside Drive Project, 3) the Lakeshore Avenue/El Embarcadero Project (collectively "the Lake Merritt Projects"), and 4) other Measure DD projects.

16. The 12th Street Reconstruction Project involves reconfiguring the existing 12-lane expressway across the 12th street dam into a six-lane boulevard. The project extends from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue.

17. The Lakeside Drive Project, which is located east of Lakeside Drive between Cameron-Stanford House and Madison street, will convert the Municipal Boathouse from an office facility to commercial uses and an upgrade of the boating facilities.

18. The Lakeshore Avenue/El Embarcadero Project, which is located west of Lakeshore Avenue from East 18th Street to El Embarcadero and includes parkland adjacent to El Embarcadero between the Lakeview Library and the Pergola, will renovate the area in and around Lakeshore Avenue and El Embarcadero.

19. The 2002 Initial Study concluded that "[n]o removal of protected trees as defined by the [City of Oakland] Tree Protection Ordinance is anticipated."

20. In November 2002, the voters of Oakland passed Measure DD, or the Oakland Trust

for Clean Water and Safe Parks, allocating bonds of $198 million to fund a variety of projects in and around Lake Merritt, including the Lake Merritt Projects.

21. In approving Measure DD, the voters of Oakland did not purport to create an exemption from CEQA or to otherwise curtail environmental review or protection.

22. In 2004, the City prepared detailed plans and specifications for the Lake Merritt Projects. During the next 18 months, three detailed tree surveys were completed. The area covered by the Lake Merritt Projects contains a total of 502 trees.

23. The Lake Merritt Projects anticipate the removal of 166 Protected Trees and 60 unprotected trees for a total of 226 protected and unprotected trees to be removed. Specifically, the 12th Street Reconstruction Project contains 347 existing trees, of which 138 Protected trees and 43 unprotected trees will be removed; the Lakeside Drive Project contains 52 existing trees, of which 20 Protected trees will be removed; and the Lakeshore Avenue/El Embarcadero Project contains 103 existing trees, of which 8 Protected trees and 17 unprotected trees will be removed.

24. Many of the trees slated for removal contain nests of birds of prey. Removal of the existing trees would result in a loss of canopy and foraging, nesting, and roosting habitat.

25. On April 11, 2006, the City of Oakland issued an "Explanation of Environmental Review Completed for Tree Permits" for the Lake Merritt Projects, which purported to review the proposed tree permits for the 12th Street Reconstruction Project (Permit # CTO5 - 006), the Lakeshore Avenue/El Embarcadero Project (Permit # CTO5 - 005), and the Lakeside Drive Project (Permit # CTO5 - 004). The City concluded that the three tree permits were exempt from CEQA review.

26. On April 13, 2006, the City approved the three Tree Removal Permits. These Approvals will result in removal of over 165 protected trees and over 50 unprotected trees around Lake Merritt.

27. On April 21, 2006, the approvals of the tree removal permits were appealed by concerned citizens, including Petitioners. The appeal raised numerous environmental and procedural concerns regarding the City's Approvals.

28. On or around June 7, 2006, the City issued a Notice of Determination, which denied

the appeal of the tree permits. The City determined that "The Project does not require further CEQA review under section 15162 of the CEQA Guidelines because no information was presented to indicate that substantial changes to the project, substantial changes in the circumstances of the project or any new information that was not known, or could have been known, at the time of the prior certified CEQA review of the Measure DD approved projects was presented."

Lake Merritt Wetlands and Widening Project

29. The Lake Merritt Channel Wetlands and Widening Project (hereinafter "the channel widening project" or "the project"), located along the Lake Merritt Channel between Lake Merritt and I-880, is part of the larger 12th Street Reconstruction Project. Specifically, the channel widening project is a proposal by the City to widen the Lake Merritt Channel, create new tidal marsh habitat and stabilize slopes along the Lake Merritt Channel and 10th Street.

30. There are a number of tall trees on the Project site, including 35 Protected Trees, as defined by the City of Oakland Tree Protection Ordinance.

31. No Environmental Impact Report has been issued for the 12th Street Reconstruction project.

32. A Notice of Preparation of Draft Tiered Environmental Impact Report for the channel widening project was prepared on October 20, 2005, and this Notice stated that the Project's Draft EIR "will tier off the previous environmental analysis" despite the fact that no EIR was prepared for the 12th Street Reconstruction Project.

33. A Draft EIR was released for the Lake Merritt Channel Wetlands and Widening Project on or about April 14, 2006. As part of the channel widening project, either 31 or 35 Protected trees will be removed. The Draft EIR states that the 35 trees to be removed by the project are a subset of the 181 trees listed for removal within the 12th Street Reconstruction Project.

34. On May 17, 2006, the City held public hearings on the project. Petitioners attended those meetings and objected to the project as proposed and the adequacy of the EIR. On or before June 2, 2006 Petitioners, members of the public, experts, and other concerned persons timely submitted written comments to Respondents critiquing the Draft EIR and the project as proposed.

35. A Response to Comments constituting the Final EIR was released in June 2006.

36. On or about July 5, 2006, the City certified the Lake Merritt Channel Wetlands and Widening Project EIR.

37. On or about July 11, 2006 the City filed a Notice of Determination that the channel widening project will not have a significant effect on the environment.

PROCEDURAL ALLEGATIONS

38. This Court has jurisdiction over this action pursuant to California Code of Civil Procedure section 1094.5 and Public Resources Code section 21168.

39. Petitioners and its members have performed any and all conditions precedent to filing the instant action and have exhausted any and all available administrative remedies to the extent required by law by, *inter alia,* submitting written and oral comments on the Approval and the EIR at each stage of the administrative process. Petitioners have submitted written and oral comments to Respondents regarding compliance with CEQA and the CEQA Guidelines of the Approval and the EIR. Petitioners have standing to bring this action.

40. Petitioners and its members timely raised each and every significant substantive and procedural issue known to them in compliance with Public Resources Code section 21177 during the review process for the Approvals and the EIR. Petitioners and its members have requested that Respondents not grant the Tree Permit Approvals. Petitioners and its members have requested Respondents not certify the Lake Merritt Channel Wetlands and Widening Project EIR. Any further exhaustion would be futile.

41. Petitioners have complied with the requirements of Public Resources Code section 21167.5 by mailing a written notice of the commencement of this action to Respondents prior to filing this Petition and Complaint. A copy of the prior written notice provided to Respondents, with proof of service thereof, is attached hereto as Exhibit "A".

42. Petitioners have complied with the requirements of Public Resources Code section 21167.7 and Code of Civil Procedure section 388 by mailing a copy of the Petition and Complaint to the state Attorney General.

43. Petitioners have complied with Public Resources Code section 21167.6 by filing a Request For Preparation of the Record of Proceedings relating to this action at the time this Petition

and Complaint was filed. The request notified Respondents that Petitioners would elect to prepare the record or that the parties would agree to an alternative method of preparation.

44. Petitioners have no plain, speedy or adequate remedy in the ordinary course of law unless this Court grants the requested writ of mandate to require Respondents to comply with their duties and set aside the Tree Permit Approvals and the certification of the EIR. In the absence of such remedies, Respondents' actions continue to violate CEQA and Code of Civil Procedure 1094.5.

45. If Respondents are not enjoined from implementing the Approvals, certifying the EIR and from undertaking acts in furtherance thereof, Petitioners will suffer irreparable harm for which there is no adequate remedy at law in that Lake Merritt and the Lake Merritt area would be irrevocably altered and significant adverse impacts on the environment would occur. Petitioners and the general public have also been harmed by Respondents' grant of the Approvals without proper environmental review, by certification of an EIR that fails to accurately and fully inform interested persons and decision-makers of environmental impacts, by Respondents' failure to make required findings, and by certification of an EIR not supported by credible substantial evidence.

46. In pursuing this action, which involves enforcement of important rights affecting the public interest, Petitioners will confer a substantial benefit on the general public including residents of the City of Oakland, the San Francisco Bay Area and the State of California, and therefore will be entitled to attorneys' fees and costs pursuant to, *inter alia*, Code of Civil Procedure section 1021.5.

47. Petitioners brings this action pursuant to Public Resources Code section 21168 and Code of Civil Procedure section 1094.5, which require that an agency's approval of a project be set aside if the agency has prejudicially abused its discretion. Prejudicial abuse of discretion occurs where Respondents have failed to proceed in the manner required by law, where decisions are not supported by findings, or where findings are not supported by the evidence.

48. This action is timely filed.

STATEMENT OF LAW

49. CEQA is an integral part of every public agency's decisionmaking process. (Pub. Res. Code §21006.)

50. CEQA was enacted to protect the environment by the establishment of administrative procedures drafted to ensure that the long-term protection of the environment shall be the guiding criterion in public decisions.

51. CEQA requires public agencies to document and consider the environmental implications of their actions before formal decisions are made. (Pub. Res. Code §§ 21000, 21001.)

52. Projects carried out by public agencies are subject to the same level or review and consideration under CEQA as that of private projects approved by public agencies. (Pub. Res. Code §21001.1.)

53. All public agencies must prepare, or cause to be prepared, and certify the completion of an EIR on any project which they propose to carry out that may have a significant effect on the environment. (Pub. Res. Code §§21100, 21151.)

54. The purpose of an EIR is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided. (Pub. Res. Code §21002.1(a).) The EIR serves not only to protect the environment but also to demonstrate to an apprehensive pubic that it is being protected. (14 CCR §15003(b).)

55. The lead agency must consider the whole of an action, not simply its constituent parts. (14 CCR §15003(h).) The lead agency is responsible for considering the effects, both individual and collective of all activities involved in a project. (Pub. Res. Code §21002.1.)

56. A "project" under CEQA is the whole of an action, including activities directly undertaken by any public agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. (14 CCR §15378.) A project is an activity by a public agency, including but not limited to public works construction and related activities, as well as clearing or grading of land. (Id.)

57. A significant effect is a "potentially substantial, adverse change." (Pub. Res. Code §21068.) This means that an activity has a significant effect if it "has the potential to degrade the quality of the environment." (Pub. Res. Code §21083.)

FIRST CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY GRANTING THREE TREE REMOVAL PERMIT APPROVALS WITHOUT CONDUCTING PROPER ENVIRONMENTAL REVIEW

58. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

59. Respondents' grant of an exemption from CEQA and issuance of a Notice of Exemption for the Tree Permit Approvals are contradicted by substantial evidence in the record, did not follow the procedure required by CEQA, and were not supported by adequate Findings as required by CEQA and CCP 1094.5.

60. There is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

61. The City's reliance on the 2002 Initial Study for grant of the Approvals is improper as the 2002 Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

62. The City's reliance on CEQA Guideline 15162 to exempt environmental review is improper.

63. Respondents' actions in failing to conduct full environmental review in association with granting the three Tree Removal Permits constitutes a prejudicial abuses of discretion in that there is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

SECOND CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY CERTIFYING THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR

64. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

65. Respondents' certification of the Lake Merritt Channel Wetlands and Widening Project EIR constitutes prejudicial abuses of discretion in that Respondents failed to proceed in the

manner required by law as set forth below.

Count One: The Lake Merritt Channel Wetlands and Widening Project EIR Fails to Adequately Describe the Project.

66. CEQA Guideline section 15124 requires a description of the project that contains information needed for evaluation and review of the environmental impacts resulting from the channel widening project.

67. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including removal of all trees authorized by the Approvals.

68. The Lake Merritt Channel Wetlands and Widening EIR project description entirely omits mention of any tree removal as part of the channel widening project's technical and environmental characteristics.

69. The Lake Merritt Channel Wetlands and Widening EIR fails to include an accurate, stable and finite project description as it alternately describes the project as resulting in removal of 35 Protected Trees and 31 Protected Trees.

70. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including channel deepening.

71. CEQA requires that a proper project description be included in the EIR. Omission of this project description was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this stable, finite and accurate project description.

Count Two: Inadequate Description of the Environmental Setting

72. The EIR fails to adequately describe the environmental setting, as it exists before the commencement of the project, to establish a baseline for analyzing potentially significant impacts. (CEQA Guidelines §15125(a); San Joaquin Raptor v. County of Stanislaus (1994) 27 Cal. App. 4th 713, 722-723.)

73. The EIR fails to describe all trees surrounding Lake Merritt which constitute the environmental setting.

74. The EIR fails to describe all protected trees surrounding Lake Merritt which

constitute the environmental setting.

75. The EIR fails to describe all birds which utilize Lake Merritt as part of EIR's environmental setting.

76. The EIR fails to describe any birds-of-prey in the order Falconiformes which utilize Lake Merritt as part of the EIR's environmental setting.

77. The EIR fails to describe any birds-of-prey in the order Strigiformes which utilize Lake Merritt as part of the EIR's environmental setting.

78. The EIR fails to describe which passerine birds protected by the Migratory Bird Treaty Act utilize Lake Merritt as part of the EIR's environmental setting.

79. CEQA requires that a proper description environmental setting be included in the EIR. Omission of this environmental setting was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this description of environmental setting.

Count Three: Inadequate Analysis of the Channel Widening Project's Significant Environmental Impacts

80. An EIR must evaluate all significant environmental effects of a proposed project. (Pub. Res. Code §§ 21100(b)(1), 21061; CEQA Guidelines §§ 15126(a), 15143.) The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." (CEQA Guideline § 15143.) EIRs should be "prepared with a sufficient degree of analysis to provide decision-makers with information which intelligently takes account of environmental consequences." (CEQA Guidelines § 15151.) The analysis must include both direct and indirect impacts, as they occur in both the short term and the long term. Identification of a projects' significant environmental impacts is a central purpose of an EIR and is necessary to implement CEQA's policy. (Pub. Res. Code §§ 21002.1(a), 21003.1(b).) Under CEQA, the EIR cannot defer analysis of impacts until a later date. This EIR's analysis of significant impacts fails to meet these standards.

81. The EIR improperly fails to include analysis of the channel widening project's impacts on nests of birds of prey in the order Falconiformes or Strigiformes.

82. The EIR improperly fails to include analysis of the Approvals' impacts on birds of prey in the order Falconiformes or Strigiformes and their nests and eggs.

83. The EIR fails to accurately assess the impacts of channel deepening.

84. The EIR fails to adequately analyze the impacts of loss of canopy and foraging, nesting and roosting habitat for migratory birds.

85. CEQA requires that such proper analysis of significant environmental impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this analysis.

Count Four: Inadequate Analysis of Cumulative Impacts

86. An EIR must also analyze and discuss significant cumulative impacts of the project. (CEQA Guidelines § 15130; Pub. Res. Code § 21083(b).) Cumulative impacts are "two or more individual effects which, when viewed together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines §15355.) The individual effects may be changes resulting from a single project or a number of separate projects. (CEQA Guidelines § 15355(a).) The cumulative impacts analysis is vital in preventing impacts which are individually minor but cumulatively considerable from overwhelming the environment.

87. An EIR must include either (A) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) a summary of projections contained in an adopted general plan or related planning document, or in a prior certified environmental document which described or evaluated regional or areawide conditions contributing to the cumulative impact. (CEQA Guidelines § 15130(b)(1).)

88. The EIR's analysis of cumulative impacts violates CEQA. The fundamental flaws in its analysis include but are not limited to the following:

89. The EIR fails to analyze the cumulative impact of this project in combination with all closely related past, present and reasonably foreseeable future projects in determining impacts to biological resources.

90. The EIR fails to provide any analysis of the cumulative impacts to geology and soils.

91. The EIR fails to provide any analysis of the cumulative impacts to hydrology and water quality.

92. The EIR contains neither the cumulative project list nor the projection summary required by CEQA.

93. The EIR's cumulative impact approach —determining first "the cumulative impact area" and then determining whether the project impacts, examined alone, is cumulatively considerable—contradicts CEQA and CEQA Guidelines 15065, 15130 and 15355.

94. The EIR applies an incorrect standard for determining cumulative biological resources impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit" to biological resources.

95 The EIR fails to consider the 226 trees that will be removed by the Approvals as part of its consideration of the cumulative biological resources impacts.

96. The EIR applies an incorrect standard for determining cumulative hydrology and water quality impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit to the environment."

97. The EIR fails to provide a reasonable explanation related to the geographic scope of the area affected by each cumulative effects analysis, as required by CEQA.

98. The EIR's cumulative impact analysis avoids the CEQA requirement that even where an incremental effect that is determined not to be "cumulatively considerable," the EIR must still briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

99. CEQA requires that such analysis of cumulative impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Five: Inadequate Analysis of Alternatives

100. CEQA Guideline section 15126.6 requires an EIR to describe and consider "a reasonable range of alternatives to the proposed project." Section 15126.6 further states that the "range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to

set forth only those alternatives necessary to permit a reasoned choice."

101. The EIR fails to analyze a reasonable range of project alternatives or to adopt feasible alternatives to substantially lessen significant adverse effects on the environment as the EIR only considers one alternative: the No-Project/No-Build Alternative.

102. CEQA requires that such analysis of alternatives be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Six: Respondents Improperly Purported to Tier the Draft EIR to "Previous Environmental Analysis" and the 2002 Initial Study

103. CEQA guideline section 15152(a) allows tiering, which includes "using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project." When tiering is used, the later EIRs or negative declarations shall refer to the prior EIR and state where a copy of the prior EIR may be examined. CEQA Guideline § 15152(g). The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier EIR. *Ibid.*

104. The Draft EIR purports to tiered off of "previous environmental analyses," including the 2002 Initial Study for all projects proposed under Measure DD, which determined that "no removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

105. The EIR violates CEQA because it improperly tiered to the 2002 Initial Study, which contains no discussion of the tree removal.

106. The EIR violates CEQA because CEQA requires tiering off of other approved EIRs, not tiering off of vague "previous environmental analysis" or Initial Studies.

107. Tiering as purported here was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying an EIR which improperly tiered.

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THIRD CAUSE OF ACTION

CREDIBLE SUBSTANTIAL EVIDENCE DOES NOT SUPPORT THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR CONCLUSIONS

108. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

109. Respondents' actions in certifying the EIR constitutes a prejudicial abuses of discretion in that there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts—given that the widening project will result in the removal of 35 protected trees and given that the widening project, along with other past, present and reasonably foreseeable future projects, will result in the removal of over 225 trees in and around Lake Merritt.

FOURTH CAUSE OF ACTION

IMPROPER SEGMENTATION OF THE PROJECT

110. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

111. The EIR fails to present or evaluate an accurate project description, and fails to describe the whole of the project, including all activities within the scope of the project. *See e.g. County of Inyo v. City of Los Angeles* (1977) 71 Cal. App. 3d 185, 193; CEQA Guidelines 15124 and "Discussion" following and 15378. Instead, the project description is "piecemealed," and thus avoids analysis of the entire project. (*See e.g. Citizens for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal. App. 3d 151).

112. The 2002 Initial Study, off of which the EIR is tiered, examines all Measure DD projects, including the Lake Merritt Projects (*i.e.*, the 12th Street Reconstruction Project, the Lakeside Drive Project and the Lakeshore Avenue/El Embarcadero Project); projects covered by the Estuary Policy Plan (*e.g.*, the Oak to Ninth project and the Jack London Square Redevelopment project); projects that would improve a number of creeks in Oakland (*e.g.*, Sausal Creek, Lion Creek of Palo Seco Creek, Cinderella Creek and Shepard Creek); and projects located within the Coliseum Area Redevelopment Plan.

113. The channel widening project is a small part of the larger 12th Street Reconstruction Project, which, in turn, is a small part of the larger Lake Merritt Projects, which, in turn, are a small part of the larger Measure DD-funded projects.

114. By describing the project as including only the Lake Merritt Wetlands and Channel Widening piece of the project and by analyzing only the environmental impacts resulting from the Lake Merritt Wetlands and Channel Widening segment of the project, the EIR engages in improper segmentation and fails to include all activities within the scope of the project.

FIFTH CAUSE OF ACTION

RESPONDENTS FAILED TO MAKE ADEQUATE FINDINGS

115. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

116. CEQA requires that no agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur: (a) The public agency makes one or more of the following findings with respect to each significant effect: (1) changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment; (2) those changes or alterations are within the responsibility and jurisdiction of another agency and have been, or can and should be, adopted by that other agency; (3) specific economic, legal, social, technological, or other considerations, make infeasible the mitigations or alternatives identified in the EIR; and (b) with respect to significant effects which were subject to a finding under paragraph (a) (3), the agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

117. Findings providing an analytical route between the evidence and an agency's ultimate conclusions are also required pursuant to Code of Civil Procedure section 1094.5.

118. Respondents failed to make adequate findings in regards to each significant effect identified by the Lake Merritt Channel Wetlands and Widening Project EIR. The findings are inadequate as they do not explain how proposed mitigations will mitigate the project, do not explain

why the facts in the record support the proposed mitigation, do not provide a logical explanation establishing the relationship between the findings and the evidence, because a separate finding is not made for each significant impact, and because the findings are not supported by substantial evidence.

119. Respondents failed to make adequate findings for grant of the three Tree Removal Permits explaining why the facts in the record support the City's decision that the Tree Removal Permits are exempt from CEQA review and because the findings are not supported by substantial evidence.

120. Respondents' failure to make adequate findings constitutes a prejudicial abuse of discretion in violation of Code of Civil Procedure section 1094.5, Public Resource Code section 21081 and CEQA Guidelines 15091.

SIXTH CAUSE OF ACTION

RESPONDENTS VIOLATED FISH AND GAME CODE SECTION 3503.5 BY AUTHORIZING DESTRUCTION OF NESTS AND TAKE OF BIRDS IN THE ORDER FALCONIFORMES AND STRIGIFORMES

121. Petitioners incorporate by reference the allegations set forth in the preceding paragraphs.

122. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.

123. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons.

124. Birds of prey in the order Strigiformes include owls.

125. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will remove 31 trees which provide potential nesting habitat for species of raptors and birds of prey, including the red-tailed hawks and red-shouldered hawks.

126. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will result in lose of nesting habitat.

127. The Lake Merritt Channel Wetlands and Widening Project EIR proposes a mitigation which includes destroying nests of birds in the orders Falconiformes or Strigiformes (birds-of-prey)

once young birds have fledged.

128. The Approvals will result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds.

129. In granting the Approvals and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

PRAYER FOR RELIEF

WHEREFORE, Petitioners and Plaintiffs Pray for Relief as Follows:

1. For a peremptory writ of mandate directing Respondents to set aside and vacate 1) the Tree Removal Permit approvals Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006, and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

2. For a peremptory writ of mandate directing Respondents to fully comply with CEQA prior to approving any Tree Removal Permit in and around Lake Merritt, including but not limited to Tree Removal Permits, Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006;

3. For a peremptory writ of mandate directing Respondents to make comply with CEQA in conjunction with the Lake Merritt Channel Wetlands and Widening Project by preparing an adequate EIR, recirculating such adequate EIR for public comment, and take any other action as required pursuant to section 21168.9 of the Public Resources Code prior to granting any future approvals for the widening project.

4. For a peremptory writ of mandate directing Respondents to make adequate findings in support of 1) any approval of Tree Removal Permits in and around Lake Merritt and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

5. For a preliminary and a permanent injunction restraining all Respondents and their agents, servants and employees, and all others acting in concert with them or in their behalf, from undertaking any physical construction, demolition or development, issuing any construction, demolition or development approvals or permits, including without limitation granting or approving any funding, or taking any other action in any way to implement the project, pending full compliance with CEQA, Code of Civil Procedure section 1094.5, and all other requirements of law.

6. For costs of the suit incurred herein.

7. For attorneys' fees pursuant to section 1021.5 of the Code of Civil Procedure; and

8. For such other and further relief as the Court deems just and proper.

DATED: August 7, 2006

LAW OFFICES OF BRIAN GAFFNEY

By: _____
Brian Gaffney
Matt McFarland

07

Dear Elois,

Please consider This material For Case #ER06001 7. DD Lake Merritt Draft Environmental Impact Report.

Thank you and Best wishes for The Process.

Sincerely,

John Wilson

510-452-5788

Lake Merritt History

In 1867, Dr. Samuel Merritt donated 155 acres of dammed tidal water from the headwaters of Indian Slough, it became known as "Merritt's Lake" and later Lake Merritt. In 1925, Lake Merritt's "Necklace of Lights" is lit for the first time during the Dons of Peralta Water Festival. There are 126 lampposts, each given by an organization or an individual. The lampposts and 3,400 pearly bulbs shine until 1941 when World War II blackout conditions are enforced.

Sometimes called the Jewel of Oakland, Oakland is the city in the United States with a salt water lake in the downtown metropolitan area. Originally part of the San Francisco bay, in 1869, Oakland Mayor Dr. Samual Merritt donated money to build a dam at the 12th Street bridge, across the "neck" of the inlet, thus creating the present day lake. It was called "Merritt's Lake", and gradually over time became Lake Merritt.

In 1963, the Wildlife Refuge at Lake Merritt was registered as a National Historic Landmark. The nation's oldest wildlife refuge, expanding 140 acres, with a shoreline of 3.4 miles around the lake. The brackish water, which consists of fresh water and salt water, of the lake is eight to ten feet deep, supporting and residing as a home to shrimp, fish, birds (migratory and residental), clams, and crabs.

Related links:
- Oakland Heritage

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Wildlife Sanctuary

Lake Merritt originally resided as a wide, tidal estuary (salt water marsh) that was known as the Laguna Peralta. The Pacific flyway has remained a sanctuary and stop-over for thousands of migratory birds.

Dr. Merritt, the Mayor of Oakland, declared the Lake a National Wildlife Refuge in 1869, the first in North America. A dam was proposed to regulate the tidal water flow, to increase the water level, with a retaining wall that is 3.18 miles in perimeter.

In 1915 organized feedings of the wildlife (ducks) began. In 1925 the first bird island was constructed and four additional islands were erected in 1956. These are the largest of the artificial islands that house hundreds of egrets, herons, canada goose, and many other species of birds. The islands are equiped with fresh water ponds. To ensure that marine sports and boating activities based at Lake Merritt aren't distruptive to the birds, a boom cordons off the five islands from this section.

California Wildlife Act

Statues of California
Eighteenth Session Chapter CCXXIV
An Act to prevent the destruction of fish and game in, upon and around the waters of Lake Merritt or Peralta, in the County of Alameda.

Approved March 18, 1870

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1 From and after the passage of this Act, it shall be unlawful for any person to take, catch, kill, capture, or in any manner destroy, any fish in the waters of Lake Merritt or Peralta, in the County of Alameda, except by the use of a hook and line; but it shall be unlawful to use any set lines, night lines or crawls in said lake.

Section 2 And be it further enacted, that from and after the passage of this Act, it shall be unlawful for any person to take, kill or destroy, in any manner whatever, the grouse, any species of wild duck, crane, heron, swan, pelican, snip, or any wild animal or game, of any kind or species whatever, upon, in or around Lake Merritt or Peralta, in the County of Alameda, and within one hundred rods from high water mark upon the land around said lake.

Section 3 Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof before any Justice of the Peace of said county, or Police Judge of any city within said county, shall be punished by a fine of not exceeding five hundred dollars, and in default of payment of such fine, shall be imprisoned in the county jail of said county, or within a city prison within said county, not more than six months nor less than one month.

Section 4 The fines collected under this Act shall be paid into the county treasury, in all cases prosecuted before a Justice of the Peace, and into the city treasury in all cases of prosecution before a Police Judge of any city within the county.

Section 5 This Act shall take effect and be in full force on and after its passage.

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Thornton, Elois A

From: Judith S Offer [joffer@juno.com]
Sent: Monday, January 22, 2007 5:39 PM
To: eathornton@oaklandnet.com
Cc: pkernighan@oaklandnet.com; dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@hyla.net; mlighty@calnurses.org; mam@ionix.net; amudge@coxcastle.com; gofindnancy@yahoo.com; rbishop747@alo.com; mepf@bacbell.net
Subject: Road Change Between Lakeview Library and Lake

Hello Ms. Elois Thornton:

I understand that you are the planner assigned to work on the change of the two one-way roads which connect Grand Avenue to Lakeshore, between the Lakeview Library and the Lake, to a single two-way road. Although the Commission has (briefly) discussed this change, I would like to suggest that you consider having the two-way road located where the traffic island between the two roads is now. Here are my reasons:

While it is wonderful to add a few extra feet to the Lakeshore, it is also important to consider the noise and exhaust pollution which would impinge on library use. As a playwright, poet, activist, and neighbor, I have often used the regular library services at Lakeview and have attended events (sometimes as the presenter) at the Library. Currently, if the windows are open there are times you cannot be heard above the noise. Also, I wonder if anyone has measured the car exhaust levels for the EIR? Putting the road two feet closer seems a little ridiculous!

Currently, the island is wasted space. It is too noisy and too exposed for picnics, resting, or any other use besides walking over it.

The Lakeview Branch is a delightful small building, with a wonderful space for events. The staff is terrific, full of help and ideas. It is an extremely popular branch, and is especially important for the large number of seniors who live in nearby apartments.

I urge you to consider this alternative.

Judith Offer

Thornton, Elois A

From: Nancy Rieser [gofindnancy@yahoo.com]
Sent: Monday, January 22, 2007 4:42 PM
To: eathornton@oaklandnet.com; Gloria Pieretti
Cc: dboxer@gmail.com; michaelcolbruno@clearchannel.com; suzie@yhla.net; mlighty@calnurses.org; mzm@ionix.net; amudge@coxcastle.com
Subject: Fw: PDF of lawsuit

Dear Ms. Thorton,

I am submitting this on behalf of Gloria Pierett, whose computer is not cooperating with her today! She was able to send this letter to me before all heck froze.

She is a collegue of mine in the Merritt Lakesiders and the No Clear Cut Group and is at the core of the Friends of the Lake Lawsuit which inspired the City to start the EIR process from scratch. Her letter is below and the lawsuit is appended as an attachment. She would like the entire lawsuit (21 pages) to be part of the record.

I will be hand delivering a hard copy of the letter and the attachment to the Planning Department momentarily.

Nancy Rieser

Nancy Rieser

Elois Thornton
City of Oakland Planning Department
150 Frank Ogawa Plaza
Oakland, Ca. 94612

Dear Ms. Thornton

As a concerned citizen who has lived in Oakland across the street from Lake Merritt for 27 years, I APPLAUD YOUR ACTIONS AND THOSE OF THE CITY FOR INITIATING A NEW EIR FOR MEASURE DD WHICH WILL INCLUDE A REPORT BY A CERTIFIED ARBORIST!

I, along with a majority of Oakland voters, cast my vote in favor of Measure DD without knowing all the details. I was shocked to learn that mature trees surrounding the Lake Merritt area and the redwoods along the channel were to be cut. Additionally, it alarmed me further to learn that the lawn in front of boathouse was to become a parking lot.

Enclosed is a complete copy of the lawsuit submitted by Attorney Brian Gaffney on behalf of Friends of the Lake. Please include it as part of the official record.

Thank you for your consideration in correcting the OMISSIONS OF THE PREVIOUS EIR.

1/23/2007

Sincerely,

Gloria Pieretti,
chairperson of the Merritt Lakesiders member, No Clear Cut Group and Friends of the Lake

1/23/2007

Brian Gaffney (CSB 168778)
Matt McFarland (CSB 225537)
LAW OFFICES OF BRIAN GAFFNEY
605 Market Street, Suite 505
San Francisco, CA. 94105
Telephone: (415) 442-0711
Facsimile: (415) 442-0713

For Petitioners/Plaintiffs

SUPERIOR COURT FOR THE STATE OF CALIFORNIA

COUNTY OF ALAMEDA

FRIENDS OF THE LAKE, DAVID MIX, GLORIA PIERETTI, and THERESE GEORGE

Petitioners and Plaintiffs,

vs.

CITY OF OAKLAND, and DOES 1 through 20, inclusive,

Respondents and Defendants.

CASE NO.:

PETITION FOR WRIT OF MANDATE AND COMPLAINT FOR INJUNCTIVE AND DECLARATORY RELIEF

By Petition and Complaint, Petitioners and Plaintiffs Friends of the Lake, David Mix and Gloria Pieretti (hereinafter "Petitioners") allege as follows:

INTRODUCTION

1. Petitioners, in bringing this action, challenge the failure of the City of Oakland (collectively "City" or "Respondents") to conduct proper environmental review of significant proposed changes to Lake Merritt, including the removal of over 225 trees from and the alteration of the Lake Merritt channel. The City's actions are illegal as they violate the California Environmental Quality Act, Public Resources Code section 21000 *et seq.* ("CEQA") and the California Code of Regulations, Title 14, section 15000 *et seq.* ("CEQA Guidelines").

2. On or about June 7, 2006, the City granted 3 Tree Removals Permits (Tree Removal Permit Nos. CTO5-004, CTO5-005 and CTO5-006 (hereinafter collectively "the Approvals") without evaluating the significant adverse impacts of cutting over 225 trees surrounding the shores of Lake Merritt.

3. Subsequently, on or about July 5, 2006, the City certified a seriously flawed Lake Merritt Channel Wetlands and Widening Project Environmental Impact Report ("EIR") which avoided discussion of the impacts of cutting over 225 trees around Lake Merritt, and inadequately analyzed the significant and cumulative impacts of tree removal and the impacts of widening and deepening the Lake Merritt channel. In reliance on the inadequate EIR, the City approved the Lake Merritt Channel Wetlands and Widening Project ("the channel widening project").

4. In addition, the City's approvals of Tree Removal Permits and a channel widening project which will remove trees that contain nests of birds of prey in the order Falconiformes and Strigiformes violate Fish and Game Code section 3503.5.

5. The City's actions will harm Petitioners, their members and the public, in that environmental values will be degraded and the Lake Merritt project area will be permanently altered—without the environmental review required by law.

PARTIES

6. Petitioner and Plaintiff Friends of the Lake ("Friends") is an unincorporated non-profit association formed after the City granted the Approvals and certified the EIR. Friends is an

alliance of individuals interested in protecting and improving Lake Merritt in Oakland, California, particularly the trees, waters and environs surrounding Lake Merritt. Friends provides a forum for local residents to be involved with Oakland neighborhood developments and to interact with the City government about neighborhood concerns, including proper City planning. Members of Friends—including citizens, taxpayers, property owners and residents—live and work near Lake Merritt, and use and enjoy Lake Merritt for aesthetic, recreational, scientific and social purposes. Friends and its members have a long-standing concern for the project area.

7. Members of Friends submitted comments in writing and verbally to the City of Oakland, *inter alia,* urging the City not to grant the Tree Removal Permit approvals. Members of Friends submitted comments in writing and verbally to the City of Oakland raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Lake Merritt Channel Wetlands and Widening Project. Members of Friends submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

8. Petitioner and Plaintiff David Mix is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. David Mix uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. David Mix is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. David Mix submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. David Mix submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

9. Petitioner and Plaintiff Gloria Pieretti is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Gloria Pieretti uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Gloria Pieretti is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Gloria Pieretti submitted comments, *inter alia*, to the City urging the City not to

grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Gloria Pieretti submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

10. Petitioner and Plaintiff Therese George is a citizen, resident, and taxpayer who lives and recreates near Lake Merritt. Therese George uses and enjoys the Lake Merritt area and other areas surrounding Lake Merritt. Therese George is concerned about proper environmental and land use planning within the City of Oakland, and has been involved in review of the planning process for Lake Merritt. Therese George submitted comments, *inter alia*, to the City urging the City not to grant the Tree Removal Permit approvals, raising concerns about adverse environmental impacts from the cutting of trees and lack of proper environmental review associated with the Approvals and with the proposed Widening Project. Therese George submitted comments to the City in this regard on May 17, 2006 and June 2, 2006.

11. Because Petitioners are interested in proper environmental and land use planning within the City of Oakland, particularly regarding Lake Merritt and the surrounding vicinity, Petitioners have a direct and beneficial interest in the City's compliance with CEQA and the CEQA Guidelines.

12. Petitioners therefore will suffer concrete, actual and imminent injury from Respondents' abuse of discretion in failing to comply with CEQA in granting the Approvals and certifying the EIR.

13. Respondent and Defendant City of Oakland is a city organized under the laws of the State of California. The City is responsible for the formulation and implementation of land use planning in the City of Oakland, including compliance with CEQA and the CEQA Guidelines, grant or denial of Tree Removal Permits, certification of Environmental Impact Reports and determining if projects are exempt from CEQA. The Oakland City Council is the City's elected body that granted the Approvals and certified the EIR.

14. Petitioners are unaware of the true names and capacities of Respondents and Defendants DOES 1 through 20, inclusive, and therefore sues said Respondents and Defendants

under fictitious names. Petitioners will amend its Petition and Complaint to show their true names and capacities when the same have been ascertained. Each of the Respondents and Defendants is the agent and/or employee of each other Respondent and Defendant, and each performed acts on which this action is based within the course and scope of such Respondent and Defendant's agency and/or employment. Petitioners are informed and believe and therefore allege that each Respondent and Defendant is legally responsible in some manner for the events and happenings referred to herein.

STATEMENT OF FACTS

Tree Removal Permits

15. In June 2002, the City released an Initial Study (hereinafter "2002 Initial Study") for all projects associated with proposed Measure DD, then known as the Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure. The 2002 Initial Study purported to review the potentially significant environmental impacts of, *inter alia*, 1) the 12th Street Reconstruction Project, 2) the Lakeside Drive Project, 3) the Lakeshore Avenue/El Embarcadero Project (collectively "the Lake Merritt Projects"), and 4) other Measure DD projects.

16. The 12th Street Reconstruction Project involves reconfiguring the existing 12-lane expressway across the 12th street dam into a six-lane boulevard. The project extends from Oak Street to the intersection of E. 18th Street and Lakeshore Avenue.

17. The Lakeside Drive Project, which is located east of Lakeside Drive between Cameron-Stanford House and Madison street, will convert the Municipal Boathouse from an office facility to commercial uses and an upgrade of the boating facilities.

18. The Lakeshore Avenue/El Embarcadero Project, which is located west of Lakeshore Avenue from East 18th Street to El Embarcadero and includes parkland adjacent to El Embarcadero between the Lakeview Library and the Pergola, will renovate the area in and around Lakeshore Avenue and El Embarcadero.

19. The 2002 Initial Study concluded that "[n]o removal of protected trees as defined by the [City of Oakland] Tree Protection Ordinance is anticipated."

20. In November 2002, the voters of Oakland passed Measure DD, or the Oakland Trust

for Clean Water and Safe Parks, allocating bonds of $198 million to fund a variety of projects in and around Lake Merritt, including the Lake Merritt Projects.

21. In approving Measure DD, the voters of Oakland did not purport to create an exemption from CEQA or to otherwise curtail environmental review or protection.

22. In 2004, the City prepared detailed plans and specifications for the Lake Merritt Projects. During the next 18 months, three detailed tree surveys were completed. The area covered by the Lake Merritt Projects contains a total of 502 trees.

23. The Lake Merritt Projects anticipate the removal of 166 Protected Trees and 60 unprotected trees for a total of 226 protected and unprotected trees to be removed. Specifically, the 12th Street Reconstruction Project contains 347 existing trees, of which 138 Protected trees and 43 unprotected trees will be removed; the Lakeside Drive Project contains 52 existing trees, of which 20 Protected trees will be removed; and the Lakeshore Avenue/El Embarcadero Project contains 103 existing trees, of which 8 Protected trees and 17 unprotected trees will be removed.

24. Many of the trees slated for removal contain nests of birds of prey. Removal of the existing trees would result in a loss of canopy and foraging, nesting, and roosting habitat.

25. On April 11, 2006, the City of Oakland issued an "Explanation of Environmental Review Completed for Tree Permits" for the Lake Merritt Projects, which purported to review the proposed tree permits for the 12th Street Reconstruction Project (Permit # CTO5 - 006), the Lakeshore Avenue/El Embarcadero Project (Permit # CTO5 - 005), and the Lakeside Drive Project (Permit # CTO5 - 004). The City concluded that the three tree permits were exempt from CEQA review.

26. On April 13, 2006, the City approved the three Tree Removal Permits. These Approvals will result in removal of over 165 protected trees and over 50 unprotected trees around Lake Merritt.

27. On April 21, 2006, the approvals of the tree removal permits were appealed by concerned citizens, including Petitioners. The appeal raised numerous environmental and procedural concerns regarding the City's Approvals.

28. On or around June 7, 2006, the City issued a Notice of Determination, which denied

the appeal of the tree permits. The City determined that "The Project does not require further CEQA review under section 15162 of the CEQA Guidelines because no information was presented to indicate that substantial changes to the project, substantial changes in the circumstances of the project or any new information that was not known, or could have been known, at the time of the prior certified CEQA review of the Measure DD approved projects was presented."

Lake Merritt Wetlands and Widening Project

29. The Lake Merritt Channel Wetlands and Widening Project (hereinafter "the channel widening project" or "the project"), located along the Lake Merritt Channel between Lake Merritt and I-880, is part of the larger 12th Street Reconstruction Project. Specifically, the channel widening project is a proposal by the City to widen the Lake Merritt Channel, create new tidal marsh habitat and stabilize slopes along the Lake Merritt Channel and 10th Street.

30. There are a number of tall trees on the Project site, including 35 Protected Trees, as defined by the City of Oakland Tree Protection Ordinance.

31. No Environmental Impact Report has been issued for the 12th Street Reconstruction project.

32. A Notice of Preparation of Draft Tiered Environmental Impact Report for the channel widening project was prepared on October 20, 2005, and this Notice stated that the Project's Draft EIR "will tier off the previous environmental analysis" despite the fact that no EIR was prepared for the 12th Street Reconstruction Project.

33. A Draft EIR was released for the Lake Merritt Channel Wetlands and Widening Project on or about April 14, 2006. As part of the channel widening project, either 31 or 35 Protected trees will be removed. The Draft EIR states that the 35 trees to be removed by the project are a subset of the 181 trees listed for removal within the 12th Street Reconstruction Project.

34. On May 17, 2006, the City held public hearings on the project. Petitioners attended those meetings and objected to the project as proposed and the adequacy of the EIR. On or before June 2, 2006 Petitioners, members of the public, experts, and other concerned persons timely submitted written comments to Respondents critiquing the Draft EIR and the project as proposed.

35. A Response to Comments constituting the Final EIR was released in June 2006.

36. On or about July 5, 2006, the City certified the Lake Merritt Channel Wetlands and Widening Project EIR.

37. On or about July 11, 2006 the City filed a Notice of Determination that the channel widening project will not have a significant effect on the environment.

PROCEDURAL ALLEGATIONS

38. This Court has jurisdiction over this action pursuant to California Code of Civil Procedure section 1094.5 and Public Resources Code section 21168.

39. Petitioners and its members have performed any and all conditions precedent to filing the instant action and have exhausted any and all available administrative remedies to the extent required by law by, *inter alia,* submitting written and oral comments on the Approval and the EIR at each stage of the administrative process. Petitioners have submitted written and oral comments to Respondents regarding compliance with CEQA and the CEQA Guidelines of the Approval and the EIR. Petitioners have standing to bring this action.

40. Petitioners and its members timely raised each and every significant substantive and procedural issue known to them in compliance with Public Resources Code section 21177 during the review process for the Approvals and the EIR. Petitioners and its members have requested that Respondents not grant the Tree Permit Approvals. Petitioners and its members have requested Respondents not certify the Lake Merritt Channel Wetlands and Widening Project EIR. Any further exhaustion would be futile.

41. Petitioners have complied with the requirements of Public Resources Code section 21167.5 by mailing a written notice of the commencement of this action to Respondents prior to filing this Petition and Complaint. A copy of the prior written notice provided to Respondents, with proof of service thereof, is attached hereto as Exhibit "A".

42. Petitioners have complied with the requirements of Public Resources Code section 21167.7 and Code of Civil Procedure section 388 by mailing a copy of the Petition and Complaint to the state Attorney General.

43. Petitioners have complied with Public Resources Code section 21167.6 by filing a Request For Preparation of the Record of Proceedings relating to this action at the time this Petition

and Complaint was filed. The request notified Respondents that Petitioners would elect to prepare the record or that the parties would agree to an alternative method of preparation.

44. Petitioners have no plain, speedy or adequate remedy in the ordinary course of law unless this Court grants the requested writ of mandate to require Respondents to comply with their duties and set aside the Tree Permit Approvals and the certification of the EIR. In the absence of such remedies, Respondents' actions continue to violate CEQA and Code of Civil Procedure 1094.5.

45. If Respondents are not enjoined from implementing the Approvals, certifying the EIR and from undertaking acts in furtherance thereof, Petitioners will suffer irreparable harm for which there is no adequate remedy at law in that Lake Merritt and the Lake Merritt area would be irrevocably altered and significant adverse impacts on the environment would occur. Petitioners and the general public have also been harmed by Respondents' grant of the Approvals without proper environmental review, by certification of an EIR that fails to accurately and fully inform interested persons and decision-makers of environmental impacts, by Respondents' failure to make required findings, and by certification of an EIR not supported by credible substantial evidence.

46. In pursuing this action, which involves enforcement of important rights affecting the public interest, Petitioners will confer a substantial benefit on the general public including residents of the City of Oakland, the San Francisco Bay Area and the State of California, and therefore will be entitled to attorneys' fees and costs pursuant to, *inter alia*, Code of Civil Procedure section 1021.5.

47. Petitioners brings this action pursuant to Public Resources Code section 21168 and Code of Civil Procedure section 1094.5, which require that an agency's approval of a project be set aside if the agency has prejudicially abused its discretion. Prejudicial abuse of discretion occurs where Respondents have failed to proceed in the manner required by law, where decisions are not supported by findings, or where findings are not supported by the evidence.

48. This action is timely filed.

STATEMENT OF LAW

49. CEQA is an integral part of every public agency's decisionmaking process. (Pub. Res. Code §21006.)

50. CEQA was enacted to protect the environment by the establishment of administrative procedures drafted to ensure that the long-term protection of the environment shall be the guiding criterion in public decisions.

51. CEQA requires public agencies to document and consider the environmental implications of their actions before formal decisions are made. (Pub. Res. Code §§ 21000, 21001.)

52. Projects carried out by public agencies are subject to the same level or review and consideration under CEQA as that of private projects approved by public agencies. (Pub. Res. Code §21001.1.)

53. All public agencies must prepare, or cause to be prepared, and certify the completion of an EIR on any project which they propose to carry out that may have a significant effect on the environment. (Pub. Res. Code §§21100, 21151.)

54. The purpose of an EIR is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided. (Pub. Res. Code §21002.1(a).) The EIR serves not only to protect the environment but also to demonstrate to an apprehensive pubic that it is being protected. (14 CCR §15003(b).)

55. The lead agency must consider the whole of an action, not simply its constituent parts. (14 CCR §15003(h).) The lead agency is responsible for considering the effects, both individual and collective of all activities involved in a project. (Pub. Res. Code §21002.1.)

56. A "project" under CEQA is the whole of an action, including activities directly undertaken by any public agency which may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. (14 CCR §15378.) A project is an activity by a public agency, including but not limited to public works construction and related activities, as well as clearing or grading of land. (Id.)

57. A significant effect is a "potentially substantial, adverse change." (Pub. Res. Code §21068.) This means that an activity has a significant effect if it "has the potential to degrade the quality of the environment." (Pub. Res. Code §21083.)

FIRST CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY GRANTING THREE TREE REMOVAL PERMIT APPROVALS WITHOUT CONDUCTING PROPER ENVIRONMENTAL REVIEW

58. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

59. Respondents' grant of an exemption from CEQA and issuance of a Notice of Exemption for the Tree Permit Approvals are contradicted by substantial evidence in the record, did not follow the procedure required by CEQA, and were not supported by adequate Findings as required by CEQA and CCP 1094.5.

60. There is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

61. The City's reliance on the 2002 Initial Study for grant of the Approvals is improper as the 2002 Initial Study states that "[n]o removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

62. The City's reliance on CEQA Guideline 15162 to exempt environmental review is improper.

63. Respondents' actions in failing to conduct full environmental review in association with granting the three Tree Removal Permits constitutes a prejudicial abuses of discretion in that there is credible substantial evidence of potentially significant environmental impacts, including cumulative impacts, resulting from removal of over 225 trees around Lake Merritt.

SECOND CAUSE OF ACTION

RESPONDENTS VIOLATED CEQA BY CERTIFYING THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR

64. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

65. Respondents' certification of the Lake Merritt Channel Wetlands and Widening Project EIR constitutes prejudicial abuses of discretion in that Respondents failed to proceed in the

manner required by law as set forth below.

Count One: The Lake Merritt Channel Wetlands and Widening Project EIR Fails to Adequately Describe the Project.

66. CEQA Guideline section 15124 requires a description of the project that contains information needed for evaluation and review of the environmental impacts resulting from the channel widening project.

67. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including removal of all trees authorized by the Approvals.

68. The Lake Merritt Channel Wetlands and Widening EIR project description entirely omits mention of any tree removal as part of the channel widening project's technical and environmental characteristics.

69. The Lake Merritt Channel Wetlands and Widening EIR fails to include an accurate, stable and finite project description as it alternately describes the project as resulting in removal of 35 Protected Trees and 31 Protected Trees.

70. The Lake Merritt Channel Wetlands and Widening EIR fails to accurately describe the project as including channel deepening.

71. CEQA requires that a proper project description be included in the EIR. Omission of this project description was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this stable, finite and accurate project description.

Count Two: Inadequate Description of the Environmental Setting

72. The EIR fails to adequately describe the environmental setting, as it exists before the commencement of the project, to establish a baseline for analyzing potentially significant impacts. (CEQA Guidelines §15125(a); San Joaquin Raptor v. County of Stanislaus (1994) 27 Cal. App. 4th 713, 722-723.)

73. The EIR fails to describe all trees surrounding Lake Merritt which constitute the environmental setting.

74. The EIR fails to describe all protected trees surrounding Lake Merritt which

constitute the environmental setting.

75. The EIR fails to describe all birds which utilize Lake Merritt as part of EIR's environmental setting.

76. The EIR fails to describe any birds-of-prey in the order Falconiformes which utilize Lake Merritt as part of the EIR's environmental setting.

77. The EIR fails to describe any birds-of-prey in the order Strigiformes which utilize Lake Merritt as part of the EIR's environmental setting.

78. The EIR fails to describe which passerine birds protected by the Migratory Bird Treaty Act utilize Lake Merritt as part of the EIR's environmental setting.

79. CEQA requires that a proper description environmental setting be included in the EIR. Omission of this environmental setting was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR, which failed to include this description of environmental setting.

Count Three: Inadequate Analysis of the Channel Widening Project's Significant Environmental Impacts

80. An EIR must evaluate all significant environmental effects of a proposed project. (Pub. Res. Code §§ 21100(b)(1), 21061; CEQA Guidelines §§ 15126(a), 15143.) The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." (CEQA Guideline § 15143.) EIRs should be "prepared with a sufficient degree of analysis to provide decision-makers with information which intelligently takes account of environmental consequences." (CEQA Guidelines § 15151.) The analysis must include both direct and indirect impacts, as they occur in both the short term and the long term. Identification of a projects' significant environmental impacts is a central purpose of an EIR and is necessary to implement CEQA's policy. (Pub. Res. Code §§ 21002.1(a), 21003.1(b).) Under CEQA, the EIR cannot defer analysis of impacts until a later date. This EIR's analysis of significant impacts fails to meet these standards.

81. The EIR improperly fails to include analysis of the channel widening project's impacts on nests of birds of prey in the order Falconiformes or Strigiformes.

82. The EIR improperly fails to include analysis of the Approvals' impacts on birds of prey in the order Falconiformes or Strigiformes and their nests and eggs.

83. The EIR fails to accurately assess the impacts of channel deepening.

84. The EIR fails to adequately analyze the impacts of loss of canopy and foraging, nesting and roosting habitat for migratory birds.

85. CEQA requires that such proper analysis of significant environmental impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudically abused their discretion in certifying the EIR, which failed to include this analysis.

Count Four: Inadequate Analysis of Cumulative Impacts

86. An EIR must also analyze and discuss significant cumulative impacts of the project. (CEQA Guidelines § 15130; Pub. Res. Code § 21083(b).) Cumulative impacts are "two or more individual effects which, when viewed together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines §15355.) The individual effects may be changes resulting from a single project or a number of separate projects. (CEQA Guidelines § 15355(a).) The cumulative impacts analysis is vital in preventing impacts which are individually minor but cumulatively considerable from overwhelming the environment.

87. An EIR must include either (A) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (B) a summary of projections contained in an adopted general plan or related planning document, or in a prior certified environmental document which described or evaluated regional or areawide conditions contributing to the cumulative impact. (CEQA Guidelines § 15130(b)(1).)

88. The EIR's analysis of cumulative impacts violates CEQA. The fundamental flaws in its analysis include but are not limited to the following:

89. The EIR fails to analyze the cumulative impact of this project in combination with all closely related past, present and reasonably foreseeable future projects in determining impacts to biological resources.

90. The EIR fails to provide any analysis of the cumulative impacts to geology and soils.

91. The EIR fails to provide any analysis of the cumulative impacts to hydrology and water quality.

92. The EIR contains neither the cumulative project list nor the projection summary required by CEQA.

93. The EIR's cumulative impact approach —determining first "the cumulative impact area" and then determining whether the project impacts, examined alone, is cumulatively considerable—contradicts CEQA and CEQA Guidelines 15065, 15130 and 15355.

94. The EIR applies an incorrect standard for determining cumulative biological resources impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit" to biological resources.

95 The EIR fails to consider the 226 trees that will be removed by the Approvals as part of its consideration of the cumulative biological resources impacts.

96. The EIR applies an incorrect standard for determining cumulative hydrology and water quality impacts by utilizing a cumulative impact significance criterion of whether the project would result in a "net benefit to the environment."

97. The EIR fails to provide a reasonable explanation related to the geographic scope of the area affected by each cumulative effects analysis, as required by CEQA.

98. The EIR's cumulative impact analysis avoids the CEQA requirement that even where an incremental effect that is determined not to be "cumulatively considerable," the EIR must still briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

99. CEQA requires that such analysis of cumulative impacts be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Five: Inadequate Analysis of Alternatives

100. CEQA Guideline section 15126.6 requires an EIR to describe and consider "a reasonable range of alternatives to the proposed project." Section 15126.6 further states that the "range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to

set forth only those alternatives necessary to permit a reasoned choice."

101. The EIR fails to analyze a reasonable range of project alternatives or to adopt feasible alternatives to substantially lessen significant adverse effects on the environment as the EIR only considers one alternative: the No-Project/No-Build Alternative.

102. CEQA requires that such analysis of alternatives be included in the EIR. Omission of this analysis was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying the EIR which failed to include this analysis.

Count Six: Respondents Improperly Purported to Tier the Draft EIR to "Previous Environmental Analysis" and the 2002 Initial Study

103. CEQA guideline section 15152(a) allows tiering, which includes "using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project." When tiering is used, the later EIRs or negative declarations shall refer to the prior EIR and state where a copy of the prior EIR may be examined. CEQA Guideline § 15152(g). The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier EIR. *Ibid.*

104. The Draft EIR purports to tiered off of "previous environmental analyses," including the 2002 Initial Study for all projects proposed under Measure DD, which determined that "no removal of protected trees as defined by the Tree Protection Ordinance is anticipated."

105. The EIR violates CEQA because it improperly tiered to the 2002 Initial Study, which contains no discussion of the tree removal.

106. The EIR violates CEQA because CEQA requires tiering off of other approved EIRs, not tiering off of vague "previous environmental analysis" or Initial Studies.

107. Tiering as purported here was a failure to proceed as required by law. Respondents prejudicially abused their discretion in certifying an EIR which improperly tiered.

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THIRD CAUSE OF ACTION

CREDIBLE SUBSTANTIAL EVIDENCE DOES NOT SUPPORT THE LAKE MERRITT CHANNEL WETLANDS AND WIDENING PROJECT EIR CONCLUSIONS

108. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

109. Respondents' actions in certifying the EIR constitutes a prejudicial abuses of discretion in that there is no credible substantial evidence to support the EIR's conclusion of less than significant biological resources impacts and less than significant cumulative biological resources impacts—given that the widening project will result in the removal of 35 protected trees and given that the widening project, along with other past, present and reasonably foreseeable future projects, will result in the removal of over 225 trees in and around Lake Merritt.

FOURTH CAUSE OF ACTION

IMPROPER SEGMENTATION OF THE PROJECT

110. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

111. The EIR fails to present or evaluate an accurate project description, and fails to describe the whole of the project, including all activities within the scope of the project. *See e.g. County of Inyo v. City of Los Angeles* (1977) 71 Cal. App. 3d 185, 193; CEQA Guidelines 15124 and "Discussion" following and 15378. Instead, the project description is "piecemealed," and thus avoids analysis of the entire project. (*See e.g. Citizens for Sensible Development of Bishop Area v. County of Inyo* (1985) 172 Cal. App. 3d 151).

112. The 2002 Initial Study, off of which the EIR is tiered, examines all Measure DD projects, including the Lake Merritt Projects (*i.e.*, the 12th Street Reconstruction Project, the Lakeside Drive Project and the Lakeshore Avenue/El Embarcadero Project); projects covered by the Estuary Policy Plan (*e.g.*, the Oak to Ninth project and the Jack London Square Redevelopment project); projects that would improve a number of creeks in Oakland (*e.g.*, Sausal Creek, Lion Creek of Palo Seco Creek, Cinderella Creek and Shepard Creek); and projects located within the Coliseum Area Redevelopment Plan.

113. The channel widening project is a small part of the larger 12th Street Reconstruction Project, which, in turn, is a small part of the larger Lake Merritt Projects, which, in turn, are a small part of the larger Measure DD-funded projects.

114. By describing the project as including only the Lake Merritt Wetlands and Channel Widening piece of the project and by analyzing only the environmental impacts resulting from the Lake Merritt Wetlands and Channel Widening segment of the project, the EIR engages in improper segmentation and fails to include all activities within the scope of the project.

FIFTH CAUSE OF ACTION

RESPONDENTS FAILED TO MAKE ADEQUATE FINDINGS

115. Petitioners hereby incorporate by reference the preceding paragraphs as though fully set forth herein.

116. CEQA requires that no agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur: (a) The public agency makes one or more of the following findings with respect to each significant effect: (1) changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment; (2) those changes or alterations are within the responsibility and jurisdiction of another agency and have been, or can and should be, adopted by that other agency; (3) specific economic, legal, social, technological, or other considerations, make infeasible the mitigations or alternatives identified in the EIR; and (b) with respect to significant effects which were subject to a finding under paragraph (a) (3), the agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

117. Findings providing an analytical route between the evidence and an agency's ultimate conclusions are also required pursuant to Code of Civil Procedure section 1094.5.

118. Respondents failed to make adequate findings in regards to each significant effect identified by the Lake Merritt Channel Wetlands and Widening Project EIR. The findings are inadequate as they do not explain how proposed mitigations will mitigate the project, do not explain

why the facts in the record support the proposed mitigation, do not provide a logical explanation establishing the relationship between the findings and the evidence, because a separate finding is not made for each significant impact, and because the findings are not supported by substantial evidence.

119. Respondents failed to make adequate findings for grant of the three Tree Removal Permits explaining why the facts in the record support the City's decision that the Tree Removal Permits are exempt from CEQA review and because the findings are not supported by substantial evidence.

120. Respondents' failure to make adequate findings constitutes a prejudicial abuse of discretion in violation of Code of Civil Procedure section 1094.5, Public Resource Code section 21081 and CEQA Guidelines 15091.

SIXTH CAUSE OF ACTION

RESPONDENTS VIOLATED FISH AND GAME CODE SECTION 3503.5 BY AUTHORIZING DESTRUCTION OF NESTS AND TAKE OF BIRDS IN THE ORDER FALCONIFORMES AND STRIGIFORMES

121. Petitioners incorporate by reference the allegations set forth in the preceding paragraphs.

122. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird.

123. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons.

124. Birds of prey in the order Strigiformes include owls.

125. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will remove 31 trees which provide potential nesting habitat for species of raptors and birds of prey, including the red-tailed hawks and red-shouldered hawks.

126. The Lake Merritt Channel Wetlands and Widening Project EIR states that the widening project alone will result in lose of nesting habitat.

127. The Lake Merritt Channel Wetlands and Widening Project EIR proposes a mitigation which includes destroying nests of birds in the orders Falconiformes or Strigiformes (birds-of-prey)

once young birds have fledged.

128. The Approvals will result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds.

129. In granting the Approvals and certifying the EIR, the City prejudicially abused its discretion and violated Fish and Game Code section 3503.5.

PRAYER FOR RELIEF

WHEREFORE, Petitioners and Plaintiffs Pray for Relief as Follows:

1. For a peremptory writ of mandate directing Respondents to set aside and vacate 1) the Tree Removal Permit approvals Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006, and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

2. For a peremptory writ of mandate directing Respondents to fully comply with CEQA prior to approving any Tree Removal Permit in and around Lake Merritt, including but not limited to Tree Removal Permits, Nos. CTO5 - 004, CTO5 - 005 and CTO5 - 006;

3. For a peremptory writ of mandate directing Respondents to make comply with CEQA in conjunction with the Lake Merritt Channel Wetlands and Widening Project by preparing an adequate EIR, recirculating such adequate EIR for public comment, and take any other action as required pursuant to section 21168.9 of the Public Resources Code prior to granting any future approvals for the widening project.

4. For a peremptory writ of mandate directing Respondents to make adequate findings in support of 1) any approval of Tree Removal Permits in and around Lake Merritt and 2) certification of the Lake Merritt Channel Wetlands and Widening Project EIR;

5. For a preliminary and a permanent injunction restraining all Respondents and their agents, servants and employees, and all others acting in concert with them or in their behalf, from undertaking any physical construction, demolition or development, issuing any construction, demolition or development approvals or permits, including without limitation granting or approving any funding, or taking any other action in any way to implement the project, pending full compliance with CEQA, Code of Civil Procedure section 1094.5, and all other requirements of law.

6. For costs of the suit incurred herein.

7. For attorneys' fees pursuant to section 1021.5 of the Code of Civil Procedure; and

8. For such other and further relief as the Court deems just and proper.

DATED: August 7, 2006

LAW OFFICES OF BRIAN GAFFNEY

By: _____
Brian Gaffney
Matt McFarland

Thornton, Elois A

From: JACQUEE CASTAIN [jacqueec@sbcglobal.net]
Sent: Monday, January 22, 2007 4:38 PM
To: Elois A. Thornton
Subject: Draft EIR for Measure DD

Dear Elois:

I am trying to FAX you two articles that pertain to two different issues that are listed as pending projects under Measure DD.

The first article is a copy of a report in the Oakland Tribune that appeared on Sunday, Jan. 29, 2006. It describes the achievements of a Bay Area African-American All-Star swimming team, and the significance the team brings to our youth. We are truly supportive of the East Oakland Sports Complex being developed and the hope and promise it will give for events that will keep our youth in positive activities. Please list our community as a strong supporter of the Sports Complex.

The second article shows pictures of a city owned **"toxic creek"** that crosses 85th Avenue close to Enterprise Way. It is next door to the Just Desserts parking lot and has weeds in the center of the creek that are close to 8 feet high. I tried to submit a request for funds to clean up the site in 2004 but the request was denied. This hazardous site is causing poor air quality in this community and needs to be removed.

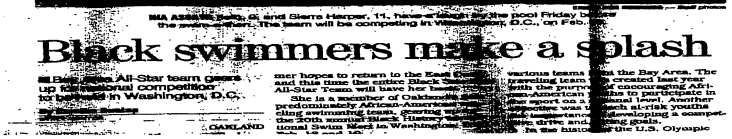
Please consider both of these issues as projects to be evaluated in the Measure DD Draft EIR. Thank you.

Jacquee Castain
Webster Tract Neighbors Association
(510) 568-5333

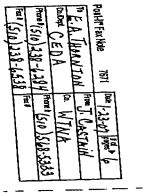
1/23/2007

swim-a-thon fund-raiser for the Black Star Line All-Star swim team in Oakland on Friday afternoon.

Black swimmers make a splash



Swimmers go for nationals



TEL:510382-9726 P.04

TEL:510382-9726 P.03

Coliseum Redevelopment Project Area
(Formerly IMO DeLaval Turbine Engine Plant site)
(located at 550 - 85th Ave.)

In 1995 the Oakland City Council designated the area from High Street to the Oakland/San Leandro border below International Boulevard as the Coliseum Redevelopment area. It was so designated as a means of rebuilding the numerous closed industrial plants to more productive uses. The largest, most toxic site was the 60.5 acre IMO DeLaval Turbine Plant which had been closed since 1985. In 1997 the company that owned the site had the land subdivided and sold it to seperate businesses.

There are several creeks on the property. The Regional Water Quality Control Board was responsible for the oversight of the toxic cleanup and creek cleanup. However, the last site to be redeveloped was the Just Desserts plant on 85th Avenue next to a creek (un-named) which is a part of the Elmhurst tributary. The Water Quality Control Board informed the community that the cleanup of the creek was the responsibility of either the Alameda County Flood Control District or the City of Oakland. It was later determined that the city was the owner of the creek as part of the land subdivision and responsible for the cleanup.

This creek is now the most blighted piece of property in this beautifully redeveloped 60.5 acre. For years it has been allowed to become overgrown and unsightly with tall weeds growing all the way to the sudewalk on 85th Avenue. A wrought iron fence has been placed on both sides of the creek to seperate it from the parking lot for the warehouses on the east side of the creek, and Just Desserts driveway on the west side of the creek.

THE CITY OF OAKLAND NEEDS TO SPEND SOME MONEY TO CLEAN UP THIS CREEK (which they own) and take some pride in maintaining it, as the other property owners have in maintaining their property.

Jacquee Castain, Webster Tract Neighbors Association (510) 568-5333

CREEKS AND WATERWAYS RESTORATION AND ACQUISITION

MAILING LIST

To be on our mailing list for future public meetings and for creek project proposals write to us at: Watershed Improvement Program, City of Oakland, 250 Frank Ogawa Plaza, #5301, Oakland, CA 94612 or e-mail us at watersheds@oaklandnet.com

CREEK RESTORATION OR ACQUISITION PROJECT PROPOSAL

To submit a project proposal to be considered, provide the following information to the Watershed Improvement Program, City of Oakland, 250 Frank Ogawa Plaza, #5301, Oakland, CA 94612

Name **Jacquee Castain - for a creek in the Elmhurst Tributary.**

Location **85th Avenue and ~~Edgewater~~ Enterprise Way.**

Site map and or photo **Photos enclosed showing the blighted creek located in the redeveloped industrial park in ~~Elmhurst~~.**

Project type **Creek clean-up.**

Project description **Creek restoration with removal of toxic and hazardous materials. Re-plant the creek with local plants.**

Estimated costs **Unknown**

Potential matching funds or volunteer resources **City funds and volunteers**

Community interest and support **This creek is the only blighted site in this newly developed industrial park. Since it is owned by the city they should take some pride in keeping it clean and well maintained.**

For more information about the City of Oakland Watershed Program see our website at www.oaklandpw.com/creeks

DEADLINE FOR PROPOSALS FOR 2004/05 PROJECT LIST

May 17, 2004

PWA-ESD Watershed Improvement Program *3/18/04*

Thornton, Elois A

From: Naomi Schiff [Naomi@17th.com]
Sent: Monday, January 22, 2007 12:42 PM
To: eathornton@oaklandnet.com
Cc: Valerie Garry; Joyce Roy
Subject: DD scoping comments

Dear Ms. Thornton,

I am writing as a board member of Oakland Heritage Alliance, delegated to attend the DD coalition meetings, and as a participant in the Lake Merritt Master Plan discussions, a few years ago.

Lake Merritt is a National Historic Landmark; historic and cultural impacts upon it must be reviewed carefully along with the other environmental impacts.

As regards structures, the original planning for the DD projects did take into consideration the proper restoring of the historic boathouse (now underway), and the relationship of DD projects to the Camron Stanford house. We hope the new EIR will take into consideration the condition and views of historic structures and landscapes around the lake such as the Eighteenth Street landing, the Oakland Auditorium/Kaiser Convention Center, the Oakland Museum, the "pergola" near El Embarcadero, connection to the Cleveland Cascade, relationship to the Lakeshore Library, Alameda County Courthouse, Vets Memorial, and the fire alarm building, and maintaining the historic landscape as a pleasant park environment, oriented toward pedestrian and bicycle users as well as those in automobiles.

In its role as a designated wildlife sanctuary, the land around the lake is significant for its use as a bird and wildlife habitat. We assume that impacts to wildlife are to be included in the study.

One way to mitigate such delays as the uproar about tree preservation would be to have a proactive plan for open and ongoing public discussions about the project as it moves ahead, with full information provided to the public about the plans.

We would like to point out that in the immediate vicinity of the DD projects area, there are a number of buildings and open spaces of historic or environmental importance. Where there is significant impact, we hope it will be reviewed. Examples include the Snow Park area, including 244 Lakeside, the Regillus Apartments, and Schilling Garden, historic buildings around Bellevue Avenue, and the relationships between the channel area and the planned park improvements.

We look forward to working with the EIR team, and stand ready to provide assistance wherever we are able. Please contact me or the OHA office (763-9218) and we will be eager to help.

Thank you so much,

Naomi Schiff
Member, Oakland Heritage Alliance Board of Directors Participant, DD Coalition

--
Naomi Schiff
Seventeenth Street Studios
1761 Broadway
Oakland, CA 94612

510-835-1717
fax: 510-835-1820

Visit www.17th.com

Thornton, Elois A

From: Joseph Matera [dzntmatera@hotmail.com]
Sent: Monday, January 22, 2007 1:38 PM
To: eathornton@oaklandnet.com
Subject: Case # ER060017 - Comments on Scope of new EIR for Lake Merritt Prop. DD Project

Meadow Area Comparison.jpg (22..

Dear Oakland Community and Economic Development Agency, Planning & Zoning Div.,

I am a member of the Save Our Meadow citizen group that attempted to save the existing meadow at 17th Street and Lakeside Drive in Lake Merritt Park. With the help of several landscape architects, our group created a plan (Option 2 - see attached) for the Lakeside Drive/Boathouse part of the Prop. DD project that saved more than twice as much meadow space as the plan (Option 1) that the city eventually adopted (see attached drawing). The city council rejected our plan because the restauranteur the city council wanted as the future tenant in the Boathouse said he (the restauranteur) did not like our plan, but could accept the plan that the Prop. DD city staff supported in its staff report.

I'm hoping that this new EIR will force the city to reconsider adopting the Option 2 plan that the Save Our Meadow group developed to save this rare and important downtown park space. Please note also that both Option 1 and Option 2 provide about the same number of parking spaces for whatever use is evenually made of the Boathouse space, but Option 1 permanently eliminates the meadow and turns it into a narrow strip which can no longer reasonably be called a "meadow". Also, the city's own Bicycle and Pedestrian Advisory Committee overwhelmingly favored Option 2 (by a vote of 7 for Option 2, 0 for Option 1). Option 2 is clearly safer for pedestrians and bicyclists.

I have other drawings that I can send showing ways that Option 2 can be reworked in ways that preserve the meadow space while adding more parking (if this is necessary) and/or moving the garbage area for the Boathouse.

The values we thought we were voting for when we approved Prop. DD - preserving, enhancing, and enlarging park space in Lake Merritt Park - should be favored over the desires of a proposed commercial tenant in the Boathouse space.

In addition, as construction and renovation has been going on at the Boathouse over the last few weeks, I have noticed an alarming development. The shoreline in front of the Boathouse has been extended several feet into the Lake, i.e. Lake Merritt has been filled in to accommodate what appears to be a new patio area for the proposed restaurant in the Boathouse. A new seawall has been constructed several feet past the old shoreline, the area has been drained, and the contractor has started to fill in the drained area. This seawall extends along the entire frontage of the Boathouse and several feet beyond on each side of the Boathouse. A significant amount of Lake Merritt has thus disappeared. I am hoping the new EIR will consider this taking away of Lake area, and require that the Lake be restored to its former area.

Joe Matera
Save Our Meadow community group

Get Hilary Duff's homepage with her photos, music, and more.
http://celebrities.live.com

From: McGuire, Linda [LMcGuire@steefel.com]
Sent: Monday, January 22, 2007 2:10 PM
To: eathornton@oaklandnet.com; taanders@up.com; kcb@cpuc.ca.gov
Subject: FW: Scanned document from CanonScanner per J. Ferrucci's request

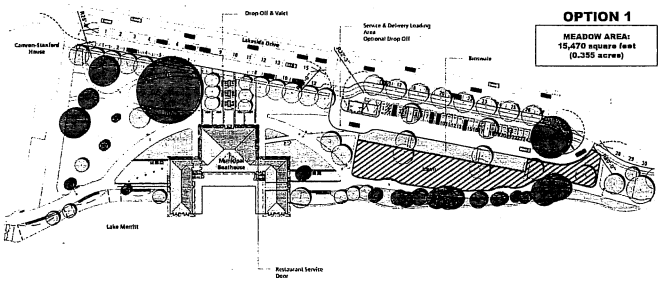
Canon Scanner.pdf
(326 KB)

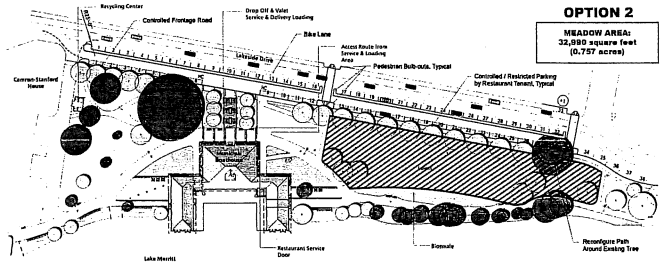
Forwarded at Joe Ferrucci's request.

Linda McGuire
Legal Secretary to
Steve Atkinson, Miriam Montesinos, Joe Ferrucci Steefel, Levitt & Weiss A Professional Corporation One Embarcadero Center, 30th Floor San Francisco, California 94111
Tel: (415) 788-0900
Fax: (415) 788-2019
lmcguire@steefel.com
www.steefel.com

This email, including any attachments, and their use by any recipient are subject to terms, conditions, restrictions and disclaimers that can be reviewed by clicking here.

-----Original Message-----
From: CanonScanner@Steefel.com [mailto:CanonScanner@Steefel.com]
Sent: Monday, January 22, 2007 2:04 PM
To: McGuire, Linda
Subject: Scanned document from CanonScanner





STEEFEL, LEVITT & WEISS
A Professional Corporation

January 22, 2007

19869

VIA EMAIL AND FACSIMILE

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612
510-238-6284 (phone)
510-238-6538 (fax)
eathornton@oaklandnet.com

Re: Notice of Preparation for the Draft Environmental Impact Report on the Measure DD Project

Dear Ms. Thornton:

We represent Union Pacific Railroad Company ("UP"). Because UP and its predecessors have been operating throughout the City of Oakland for many decades, UP has been following with interest the Measure DD Project (the "Project"). UP appreciates this opportunity to comment on the City's Notice of Preparation ("NOP") of a Draft Environmental Impact Report ("Draft EIR") on the Project. By this letter, UP presents its comments.

Many people know about UP's distinguished history. UP played a prominent role in the development of the first transcontinental railroad in the late 1860's. What many people do not know is that today, UP remains a significant owner of railroad property and a major freight transporter in the western two-thirds of the United States. In fact, UP is the largest railroad company in North America.

Of particular relevance to the Project, UP owns a railroad yard, a railroad line and right of way in Oakland (the "UP line") that roughly parallels the I-880 freeway. UP operates freight services, and Amtrak operates passenger services, on the UP line. The UP line experiences a very high volume of rail traffic, as it serves the entire metropolitan Bay Area and is a major transportation corridor through Northern California.

Given UP's significant presence throughout the City, UP takes great interest in the City's growth and improvement. It is with this perspective that UP respectfully submits the comments in this letter. On UP's behalf, we would welcome an opportunity to sit down together with City officials and staff to discuss any aspect of this Project or any other project that may

relate to UP's property or operations within the City of Oakland.

1. Oakland and UP: the Big Picture

Before addressing the Measure DD Projects specifically, we thought it might be helpful to comment, more generally, on the relationship between the City of Oakland and UP. The City sits at the center of the bustling and economically vibrant San Francisco Bay Area. The Oakland waterfront boasts one of the busiest containerized shipping ports in the country, and downtown Oakland is a growing business center. Oakland is also a city with a wide variety of residential neighborhoods, from which residents commute to workplaces in Oakland, San Francisco, Silicon Valley, and beyond. Without a doubt, more and more people, cars, and trains will travel into and out of Oakland every day over the coming decades.

As the City continues to flourish, however, the capacity of its transportation network is not likely to expand significantly, due to, at a minimum, space limitations. There is no foreseeable place, for example, to build new freeways or streets in the midst of the City's patchwork quilt of neighborhoods. Accordingly, freeways and streets will experience more traffic over time, and we can expect that as a result, increasing numbers of businesses and people will rely on rail services to bypass congested roadways. Thus, it would seem to be in the City's best interest to take affirmative steps now that will protect and enhance those rail lines and services, so that they will continue to serve the City, its residents, and its economy effectively and efficiently in the near and distant future.

At the risk of stating the obvious, development near the UP line can negatively impact rail services and create unintended consequences that are in neither UP's nor the City's best interests. For example, new offices, retail establishments, housing, and other land uses, such as near Jack London Square, predictably attract more cars and pedestrians to the areas around the UP line. Cars and pedestrians must cross the UP line at at-grade crossings, and people sometimes trespass onto the railroad right of way. In addition to the obvious safety concerns of which UP remains vigilantly aware, these factors also have the result that trains may be forced to proceed more slowly through the City, and/or to make more frequent emergency stops, which makes rail service less effective and efficient. Moreover, the interaction of people and trains may make people all the more aware of the natural and unavoidable features of rail service, including noise, mechanical odors and vibration.

Ever realistic, UP recognizes that as Oakland continues to grow and thrive, new development and re-development is likely to continue to occur on sites near the UP line in Oakland. In general, UP requests that the City seek to mitigate the impacts of new development on UP's line and rail services by requiring appropriate mitigation measures. Those measures may vary depending upon the nature of the proposed development. Such measures include, for example, requiring grade-separated roadway bridges and sidewalks where it is necessary for vehicles and people to cross the UP line, sound walls, fences and other barriers, and public education. UP would welcome the opportunity to work collaboratively with City officials and

staff to develop long-range public policies to help guide new development near the UP line, with the goal of avoiding or reducing negative impacts.

2. Measure DD Improvements Near the UP Line

Many of the foregoing global concerns arise, with more specificity, in the context of the Measure DD Project. The Project includes a list of improvements that will be funded by Measure DD. Based on the NOP, we have identified several such improvements that would be located close to the UP line. They include: (1) the Lake Merritt Channel improvements; (2) the Oakland Waterfront Trail and Access improvements; (3) the East Oakland Aquatic, Sports, and Recreation Complex improvements; and (4) creek restoration at specified sites along Sausal and Seminary Creeks. For each of these improvement projects, UP requests that the Draft EIR carefully consider possible impacts on the UP line and set forth appropriate mitigation measures.

3. Lake Merritt Channel Improvements

The Project includes improvements along the Lake Merritt Channel (the "Channel") that are "intended to improve water flow, provide small boat passage, enhance bicycle and pedestrian access, [and] restore wetlands." (NOP, at 2.) In addition, the restrictive culvert at 10th Street will be replaced with a clear-spanning bridge, and a gated by-pass channel will be constructed around the 7th Street Flood Control Station. (*Id.*) The UP line crosses a bridge that spans the Channel, at point close to the mouth of the Channel.

The Draft EIR should discuss how these improvements could affect the UP line and bridge, as follows. First, because the improvements could disturb the soil along the Channel, the Draft EIR should discuss whether they could structurally or physically impact the UP line or bridge. The Draft EIR also should discuss whether the improvements would involve excavation of potentially contaminated soils, and if so, whether any UP workers or patrons could become exposed to such contaminants.

Second, the pedestrian, bicycle, and small boat improvements likely will attract more people to the area immediately surrounding the UP line. More people may walk or bike across the UP line, and/or walk, bike, or boat underneath the UP bridge. In addition, some of these individuals may trespass onto the UP line. These potential impacts raise concerns about pedestrian safety and interference with rail operations. In addition, people near the UP line would experience the typical noise, mechanical odors and vibration that come with freight and passenger rail service along the UP line.

Third, with respect to the 10th Street bridge project and the bypass channel project, the Draft EIR should examine whether any construction-related traffic impacts would result. Specifically, would these projects divert traffic to nearby streets, such as 5th Avenue, where the UP line crosses the roadway at grade? Would they increase queuing of cars at intersections, such that cars would be more likely to idle over the tracks? Such traffic impacts

not only would affect rail operations, but also could have safety implications for motorists and pedestrians.

Fourth, the Draft EIR should examine whether either the 10th Street bridge project and the bypass channel project would alter the water levels or water quality in the Channel in such a manner as to affect the UP line or bridge.

4. Oakland Waterfront Trail and Access Improvements

The Project includes development of a hiking and biking trail along the Oakland waterfront, including the related acquisition of waterfront properties and remediation of soil contaminants. (NOP, at 4.) The trail would run from roughly from Broadway to 60th Avenue. (*Id.*, at 7.) The distance between the trail and the UP line would vary from one point to another. (*Id.*) In some places, such as in the vicinity of the mouth of the Channel, the trail would be located immediately adjacent to the UP line. (*Id.*) In other places, as in the area south of High Street, the distance increases to more than one-half mile. (*Id.*) In addition, the trail would actually cross an active freight service line that runs from the UP line west along Fruitvale Avenue into the City of Alameda. (*Id.*)

The proposed waterfront trail raises several concerns that the Draft EIR should address. First, the trail would attract more pedestrians and cyclists to the area around the UP line. Some of those people would walk across the UP line to reach the trail at various points, and others might trespass onto the UP line itself. These potential impacts raise concerns about pedestrian safety and interference with rail operations. In addition, people near the UP line would experience the typical noise, mechanical odors and vibration that come with freight and passenger rail service along the UP line.

Second, remediation of contaminated soil along the waterfront raises the concern that UP workers or rail patrons could be exposed to contaminants. On a related topic, because remediation would probably involve soil disturbance, the Draft EIR should examine whether any improvements done near the UP line would structurally or physically impact the tracks or any other improvements in UP's right of way.

5. East Oakland Aquatic, Sports, and Recreation Complex Improvements

The Project includes a major expansion of the Ira Jenkins Park/Recreation Center (the "Center"), located at the corner of Edes and Jones Avenues. (NOP, at 5.) The UP line crosses several roadways at-grade to the immediate east of the Center, including, but not limited to, the ones at 85th Avenue and 96th Avenue. (*Id.* at 8.)

The Draft EIR should examine whether traffic would increase at these at-grade crossings as a result of the Project, including whether nearby queuing from roadway intersections would cause vehicles to idle over the tracks while waiting at traffic lights. Any such impacts

would raise concerns about safety and rail operations.

In addition, patrons of the Center may walk or jog in the neighborhood around the Center, meaning that some likely would walk across the UP lines at the aforementioned at-grade crossings, or might trespass onto the UP right of way itself. This increase in pedestrian activity near the UP line could implicate pedestrian safety around the tracks.

6. Restoration Along Sausal and Seminary Creeks

The Project includes creek restoration activities at designated sites throughout Oakland. (NOP at 5.) Creek restoration activities include bank stabilization, erosion control, hydrology restoration, riparian habitat restoration, introduction of native wildlife, and public education displays (implying public access). (*Id.*) Figure 3 in the NOP indicates that two creek restoration sites would be located approximately a mile or less upstream from the UP line, one on Sausal Creek and another on Seminary Creek. (*Id.* at 9.)

These creek restoration activities raise several issues that the City ought to address in the Draft EIR. The first is whether the public access improvements would attract any additional pedestrians or cyclists across or around the UP line. If so, the Draft EIR should examine the possible safety impacts.

With respect to bank stabilization, erosion control, hydrology restoration, riparian habitat restoration, and introduction of native wildlife, UP concerns are similar to those stated with respect to other aspects of the Project, as discussed above. Specifically, if these improvements involved excavation of potential soil contaminants, could such contaminants flow downstream, such that UP workers or rail patrons would suffer exposure? In addition, the Draft EIR should consider whether any of these improvements would change downstream water levels or water quality.

UP will appreciate it if the City, as lead agency, gives due consideration to the above concerns. UP looks forward to having an opportunity to review the Draft EIR on the Project when it becomes available for public comment. More importantly, UP looks forward to working in collaboration with the City to ensure that all future development near the UP line is compatible with the rail services that will continue to serve the City for years to come.

Please give notice to UP of all future developments with respect to the Project as follows:

Mr. Terrel Anderson
Manager of Industry and Public Projects
Union Pacific Railroad Company
10031 Foothills Boulevard
Roseville, California 95747-7101

With a copy to:

Lisa M. Carvalho, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 30th Floor
San Francisco, California 94111

Please do not hesitate to contact our office if you have any questions or concerns.

Sincerely,

Lisa M. Carvalho

Lisa M. Carvalho

LMC/JF

cc: Mr. Terrel Anderson (via email in .pdf format)
Union Pacific Railroad Company
Mr. Kevin Boles (via email in .pdf format)
CA Public Utilities Commission

19869:6551079.4

Thornton, Elois A

From: RBishop747@aol.com
Sent: Monday, January 22, 2007 11:36 AM
To: Eathornton@oaklandnet.com
Cc: jim@virtualperfection.com
Subject: DD Bond Measure EIR scoping comments

Elois Thornton,

I am a Member of the Measure DD Committee since its inception. I have a three issues about the trees. My three issues are **tree removal**, introduction of new **non-native species**, introduction of species known to be **highly allergenic**.

I feel that some of the trees slated for removal should remain. I am also Bicycle Safety Instructor and know that the bike lane around Lake Merritt can have turns and curves in the path if done correctly. The Bike Route should not be the cause of removal of trees. I also am concerned about the trees at the end of International Street.

Next is the suggested introduction of non-native new trees. From the plans I have seen I noticed that there is to be an introduction of many new non-native species. I am for diversity, but this can be carried to extreme easily.

The highly allergenic Gingko in particular is of concern. The plan shows the Gingko to be planted in a continuous line around a major portion of Lake Merritt. This type of formal planting replicates issues encountered when species are planted in groves and increases the likelihood of a walker having an allergic reaction due to increased male pollen of one species in the vicinity. Only the Gingko male species, the pollen producer, will be planted. There has been no consideration for the introduction of highly allergenic species and the reaction on the populace. There has been no consideration that grove plantings increase the number of allergic reactions. Approximately 20% of the U.S. population has allergies and consideration should be given. The Gingko has a high level of allergens and has a rating of 10 on a 10 scale to cause allergic reactions in those that have allergies..

Please direct the specifier of the plant materials to do their homework and choose species more benign. All trees have pollen, but not all trees have the kind of pollen that rates high in causing allergic reactions.

Sincerely,

Ron Bishop - Architect - AIA
Bishop Architecture
Bicycle Safety Instructor - LCI
[510] 652-4667

From: Millsmont Homeowners Association [MHA@chimescreek.com]
Sent: Sunday, January 21, 2007 11:17 PM
To: eathornton@oaklandnet.com
Subject: Case number ER060017 Comments on the NOP
To: Elois Thornton, Planner IV
Community and Economic Development Agency
250 Fran H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

fax: 510-238-6538
email eathornton@oaklandnet.com

Re: Case number ER060017
Project: Measure DD

SUBJECT: Comments on the NOP of a DEIR for Measure DD Project

On behalf of the Millsmont Homeowners Association representing property owners along Chimes Creek in the Lion Watershed, I wish to request that Chimes Creek be considered for funding under Measure DD for "the improvement of water quality, hydrology and wildlife habitat to prevent floods, improve public accessibility and increase community stewardship." The headwaters of Chimes Creek is located just above the recently completed Leona Quarry development in the hills above I-580. As part of the drainage improvements for the Leona Quarry project, drainage from the Ridgemont watershed which had been creating havoc in the Leona Canyon since the 80's, was diverted to the detention pond at Leona Quarry, and hence to Chimes Creek. Combined with additional subsurface and surface runoff from this development, Chimes Creek in just a few short years has experienced an increase in the amount of urban runoff, sedimentation and erosion of its banks.

Along with Horse Shoe Creek, Chimes Creek is a major tributary to Lion Creek which travels through Mills College and along the newly constructed Lion Creek Crossings Residential Development (the former Coliseum Gardens) on its way to the Estuary. While creek projects are underway to daylight and restore previously channelized creeks to a "natural" meander, such efforts may amount to little more than window dressing if upstream environments are neglected and left to deteriorate to the point where they too, must be channelized to control erosion and pollution.

Although most of Chimes Creek runs through and behind private property, there are a number of public access easements, typically where City storm drains feed into the creek through concrete pipes and at City constructed revetments. The terminus of Nairobi Place is City owned property, however, and in the past supported a pedestrian bridge that allowed the public to walk across to Hillmont Ave. Presently, an EBMUD water main is the only facility that spans the creek at this location (aside from an exposed sewer main) -- and the area is not particularly conducive to *wholesome* public recreational use. Aside from tending to occasional sewage spills in and around this location, the City has paid little attention to the maintenance or improvement of this area. The result has been to create a security hazard and a lost opportunity for public access to a creek that has remained remarkably natural in an increasingly urbanized area.

Thank you for providing the Millsmont Homeowners Association the opportunity to comment on the scope of the Measure DD EIR.

Sincerely,

Chiye Azuma
Secretary
Millsmont Homeowners Association

Thornton, Elois A

From: Anne.Symanovich@wellsfargo.com
Sent: Friday, January 19, 2007 2:04 PM
To: eathornton@oaklandnet.com
Cc: gofindnancy@yahoo.com
Subject: DD Bond Measure EIR scoping comments

Dear Ms. Thornton –

It is terrific to learn that the City of Oakland is reopening the EIR process. I'm sure that a new plan for enhancing the Lake and its wildlife can be developed.

I'm really hoping that the planners will give absolute top priority to BIG TREES. These are the foundation of everything! We need them to hold the soil together, clean the air, and shelter all manner of birds and little critters. That's a lot of services! Little trees are very nice – and I'm hoping that a lot of little trees will be planted so we can have more big trees later on – but there's just nothing that can replace the huge canopies of our older trees.

Also, trees = money, and big trees = big money. Why else would newspaper stories describe nice streets or affluent suburbs as "leafy"? This is shorthand for "high-rent district". Big trees are such an amenity that they are worth big bucks to property holders. (Not that you could get a big tree planted next to your house even for really big bucks – instead, you'd have to plant a smallish one and wait a long time.) Lake Merritt's big trees are just stunning. How could we even think of giving up these treasures? Can we not plan around them?

Please, let's get a plan that showcases our beloved giants and that opens up green space for all the citizens of our asphalt-covered city. We are fabulously wealthy. Let's use our heritage to best advantage rather than waste it.

Thanks for listening.

Anne Symanovich
Oakland Taxpayer, 30 years
Friend of Lake Merritt
415-222-9547

January 18, 2007

Ms. Elois Thornton
City of Oakland CEDA, Planning Department
250 Ogawa Plaza Ste. 3315
Oakland CA 94612

Re: Comments regarding proposed waterfront fence and pylon

Dear Ms. Thornton:

Please consider the following comments regarding the proposed Bay Trial fence and pylon, prototypes of which are on view at Estuary Park.

I am familiar with the environs of the Estuary waterfront, having since 1994 served as president of the Jack London Aquatic Center, at Estuary Park. I write this letter in my capacity as a resident of Oakland, and not on behalf of the Jack London Aquatic Center.

My reactions to both prototypes are extremely negative. I strongly urge the City to reject both.

A. The fence prototype -- too bulky and too "cutesy."

I appreciate that, in a few places along the Bay Trail, the sharp drop-off between the trail-edge and the waters of the Estuary will be so great that pedestrian-safety compels the installation of a fence. It is essential, however, that that such fence *not* be a *wall*. The fence-design should consist of minimalist horizontal lines, so that one can easily see *through* the fence to the water, both up close and from a distance.

I suspect that your designer considers such minimalist design too ordinary, and not artistically challenging. I would counter that the featured attraction on the Bay Trial should be the natural interface of water and shoreline, not a piece of linear public art masquerading as a fence.

The prototype fence is comprised of three layers of overlapping cut-out steel. Its "look" is that of a corset. Its "little-fishy" motif is juvenile, appropriate for a nursery-school, but not for the Estuary. Finally, the fence's primary-blue paint is an unnecessary, overstated reminder that the water beyond the fence is, or should be, blue.

B. The pylon prototype -- a "non-thing."

I fully support the artistic vision of a series of pylons and related installations that will guide pedestrians down the length of the Bay Trial.

The proposed pylon does *not* serve that vision.

The purpose of the trail-map (at the top of one of the pylon's three faces) is presumably to enable pedestrians to fix their location on the Bay Trial. The prototype map fails this purpose utterly.

First, the map includes *no* reference to Lake Merritt Channel, the waterway that connects Lake Merritt to the Estuary. This waterway is one of the most important features of the Estuary waterfront: it is contemporary reminder of what was historically a quarter-mile-wide connection to the slough now known as Lake Merritt; further, the intersection of the Channel with the Estuary is one of the key "X-Y" axes that orients our City geographically and psychologically.

Second, as one looks at the map from Estuary Park, one would believe that the shoreline extending to the southeast is an extended straight line. In fact, that shoreline is comprised of Lake Merritt Channel (noted above) and then the bulge that accommodates the proposed Oak-to-Ninth project. The proposed map simply deletes this major neighborhood from the waterfront.

The *other* two faces of the pylon are startlingly banal. I do not "get" the impressions of flowers and other items that appear on these faces. These impressions have nothing to do with the Estuary, the shoreline or our City. They describe nothing, they evoke nothing, they do not even amuse. At the risk of offending the artist, these faces look like they were acquired wholesale, as excess "monument" inventory. They are silly, without the saving grace of being whimsical.

I am told that the horizontal element (toward the bottom of the pylon) evokes the cross-hatched utility poles that once lined the Embarcadero. I am familiar with those utility poles. The horizontal element does not evoke them.

Finally, allow me share an experience, which initially surprised me. Immediately after my eye registers the physical presence of the pylon, the pylon disappears from my awareness; my eye looks right past the pylon, as if it were not even there. I do not know what combination of structure, color and psychology has created this *non*-impression.

Rather than constituting a Bay Trail punctuation, the pylon is to me a "non-thing." It's not just that the pylon's purpose is unclear; the pylon does not even tickle my curiosity regarding its purpose.

Sincerely,

Robert Kidd
61 Marr Ave., Oakland CA 94612
(T) 510-287-2365

RECEIVED
JAN 12 2007
City of Oakland
Planning & Zoning Division

Elois Thorton, Planner IV
C.E.D.A.
250 Frank Ogawa Plaza, ##3315
Oakland, CA 94612

RE:: case # ER060017 Measure DD project

TREES

The citizens of our city never intended DD to be used to deforest Oakland. It was intended to enhance open space and parkland. Planning Commissioner Michael Lighty suggested having a report on every tree to be removed stating why that particular tree was slated for destruction. It's a good idea, but it doesn't go far enough. If a heritage tree as defined in Oakland's Municipal code is slated for removal,,options from a qualified arborist for preservation and treatment of the tree should first be examined by a citizen's task force. Sick trees can sometimes be treated and recover nicely. trees with structural problems can be helped by careful pruning and sometimes guylines.If the tree is in the way of straight line construction then don't do straight line construction. A curving path through the trees can be beautiful. The park will look more interesting with a mix of old and new trees of different sizes and species. Of course hazardous trees and sick trees that are beyond recovery even with the best of care need to be removed,, and our city needs to find a way tocare for our trees so they don't get to that point due to city negligence.

TRAFFIC

areas where lanes will be omitted should have an experimental period

for a few months where a temporary barrier blocks off the lanes. This trial run will give Oakland empirical data as to how well this will work. The trial run should be well publicized through te usual media and through very large signage on or near the barriers with a number to call if there are serious backups and bottlenecks. Emergency vehicle drivers should be polled on whether they find it a serious problem or not. If things need to be adjusted it will be cheaper and easier if no construction has started and the barriers can be moved or removed.

Digression

On international in East Oakland near the fruivale BART they put up a median strip with hitching posts for horses. This strip has created a traffic bottleneck that was not there before. HAD THEY EXPERIMENTED....

KAISER CONVENTION CENTER

As of now we don't know to what use this beautiful Oakland landmark will be put. It will have more use options with a parking lot than without one. The parking lot and it's magnolias should remain intact at least until a permanent use is decided. then the issue of the parking lot should be revisited. Even if the lot is to be removed the magnolias should stay. THE PARKING LOT WOULD MAKE AN INTERESTING WEEKEND FARMER'S MARKET.

Transportation

There needs to be parking near the park. I'd like to see a whimsically designed, green technology open tram taking people from a single parking lot, perhaps underground, on a circular route around the park with stops at various locations marked by a whimsical tram stop marker. this tram should either be very low cost or free. perhaps it would be good publicity for a company that designs green technology. perhaps such a company might underwrite the cost.

When I was young, as I recall there was a tram that went from the boathouse to Fairyland. The stops were marked by a sign of a life sized toy soldier guard in a striped guardhouse. This was separate from fairyland's "Jolly Trolly" which went from inside fairyland to a picnic area and another toy train that went around the area next to the oakland auditorium. (A large wheel that marked the train station is still there. so this isn't a new idea!) I'm proposing one tram where the route covers the whole lake. the tram itself can be the attraction or it can bring people to various points.

Bicycles

Dacy reminds me that not only do people need bicycle paths, but they also need bicycle racks to lock up their bikes. Having your bike stolen can ruin your day and discourage people from enjoying the park. It seems to me that it would make sense to have drinking fountains nearby.

AERATING FOUNTAINS

could we have one near 14th? or near the twevth street overpass? could someone straighten out the one near the bandstand, which is usually cockywampus? Could you be more specific about what a "goose management" element is? Do I want to know?

EASMENTS

The recent Brown administration has been the most rapacious administration in memory. Although I have high hopes for the Dellums administration to be better, the citizens of Oakland need this effort protected. We don't want to spend all this money and then have the land go for lakefront condominioms built by Perata's cronies.

EASMENTS-continued

To protect oakland citizens from a land grab we deserve a conservation / open space easment on all properties obtained or reclaimed from lanes being reconfigured under DD. No permanent buildings should be allowed unless they pertain to parkland purposes and no structures over one story.((so you could build a bathroom, first aid station or security station) We need a very ironclad easment to protect our money and effort. Where it is appropriate a strict preservation easment should be given to buildings such as the Kaiser Convention Center, The Cameron Stanford house and the 9th Avenue Terminal. And of course the Studio one arts Center. We should not allow these lands to be sold, swapped, leased, traded for political favors or otherwise conveyed at the whim of some future administration.
ALL DD LANDS WHETHER OBTAINED BY DD OR SIMPLY IMPROVED BY OUR MONEY SHOULD BE EASEMENTED.

SECURITY

Bring back the horse patrol!

OBLIGATIONS

When you have an asset like lake merritt and our creeks and waterways you also have an obligation. we need to find a way to keep these thiings nice and clean. Lake merritt is beautiful partly because it is in a beautiful setting with the Oakland hills in the background and some very special landmark buildings around it. the context and setting gives Lake Merritt it's beauty and a sunny sense of space. If we choke it off with a lot of big, ugly, and mostly unaffordable buildings casting shadows and blocking views of the hills and the sunset we are going to wind up with an ugly little puddle. In truth the area around lake merritt is already very densely populated. The lake needs room to breathe so we all can breathe there. In the Lakeside Apartments neighborhood, where

I live, we have been inundated with development which has greatly diminished our quality of life. Personally I think this project is worth doing IF it is done correctly and not as another rapacious game. I ask that you be cognizant that this is a residential neighborhood which has sufferred from the cumulation of several projects and draw your attention to CEQA 15300.2 (b), Which speaks to cumulative impact. Please try to find a way to minimize the impacts of this project on a densely populated, residential neighborhood which has sufferred more than it's share of construction and it's accompanying mess, noise, and inconvienience from a city that is out of control. The quietest possible technologies should be used and we really don't like to start our day with the loud, incessant noises of construction. we need to work out hour and days so we can have the "quiet enjoyment of our homes", which is by the way our legal right by state law. I think this project is worth doing for all of Oakland but find a way to be courteous.

Sincerely,

Orna Sasson

Orna Sasson
L.A.N.A.
1428 Jackson St
Oakland, CA 94612

P.S. I would like to point out that DD was voted on by the citizens of Oakland. It is something we decided and is NOT being forced on us. If it is enacted in the spirit we voted on it for, I am proud of my city.

Thornton, Elois A

From: Philip Dow [pdow@mindspring.com]
Sent: Sunday, January 07, 2007 9:59 AM
To: Elois A. Thornton
Subject: Meassure DD EIR

Dear Ms. Thornton,
I intended to get the attached letter in the mail Friday but got bogged down with business issues. I hope the Word attachment work for meeting the deadline. I'll put a hardcopy in the snail-mail Monday morning.
Thanks,
Philip Dow

Oak Knoll Coalition
Generating citywide support to create long-term benefits at Oak Knoll
P.O Box 5733, Oakland, CA 94605

HEIA
OKNIA
Sequoyah Heights
Sequoyah Highlands
Sequoyah Hills
SHOKNA

January 5, 2007

Elois A. Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Case File Number: ER06-0017

Dear Ms. Thornton,

The Oak Knoll Coalition has asked me to communicate our interests and concerns regarding the Measure DD impacts on future creek improvements.

As you may be aware, SunCal, the owners of the former Oak Knoll Naval Hospital, are in the process of creating a development plan for that site. One element that has the community very excited is daylighting Rifle Range Creek, half of which is currently culverted and the rest seriously neglected. The plan calls for creating a restored riparian watercourse through the entire property.

The plan also calls for establishing hiking trails that follow the creek and connect to the East Bay Regional Park's Leona Canyon and to Mountain Boulevard, which would lead to the Oakland Zoo and State Arboretum. Thus, the restored creek will become an environment that can be experienced by all residents of Oakland.

While not organized yet, there seems to be considerable interest in establishing a neighborhood volunteer network that would focus on Rifle Range Creek to provide maintenance support once the restoration is complete.

Therefore, we request that the EIR review the ways in which Measure DD funds can assist in restoration and maintenance of Rifle Range Creek.

Sincerely,

Philip Dow
President

Thornton, Elois A

From: James Zahradka [jzahradka@excite.com]
Sent: Sunday, January 07, 2007 10:35 AM
To: eathornton@oaklandnet.com; wwlassowsky@oaklandnet.com; nnadel@oaklandnet.com; jmpeter@oaklandnet.com
Cc: lourdesoakland@aol.com
Subject: ER 06-0017; Our Lady of Lourdes Catholic Church comments re Measure D EIR

Our Lady of Lourdes Catholic Church would like to comment on one aspect of the Measure DD projects; namely, the planned removal of the pedestrian crosswalk across Lakeshore Avenue nearest to the entrance to our church. We oppose this removal.

This crosswalk is important for the safety of our parisioners, parish staff, and others who use Our Lady of Lourdes's facilites. Every weekend we welcome more than 700 people to our three Masses; that number increases severalfold for major holidays such as Easter and Christmas. Further, dozens of people join us to celebrate daily Mass. Many of our parishioners are elderly--some wheelchair-bound--or families with young children. Many of these people walk to Mass and utilize the currently-existing crosswalk. Their safety is of paramount importance to us.

Our Lady of Lourdes has also been home to several educational institutions, including our own elementary school, the University of San Francisco's East Bay campus, and St. Paul's Episcopal School. Students from all of these schools used the crosswalk extensively; in particular, the St. Paul's students used it to access Lakeside Park for their lunch and recess activities.

Starting with the next academic year, we plan to rent the school facility to the Bay Area Educational Institute, a high school for students with learning disabilities. They likely plan to use the crosswalk in a similar fashion to St. Paul's.

Finally, I would note that the parish has not been consulted prior to the decision to remove the crosswalk. It was only because an alert parisioner noticed, when reviewing a diagram of the proposed changes to Lakeshore, that the crosswalk was not part of the plan that we were made aware of this proposed significant change.

In short, the existence of the crosswalk is critical to the safety of the hundreds of parisioners, students, and parish and school staff associated with the parish and its lessee. We urge you not to remove it.

Thank you for your consideration.

Sincerely yours,

James Zahradka
President
Our Lady of Lourdes Catholic Church Pastoral Council

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Thornton, Elois A

From: JOHN BOWERS [jbowers45@msn.com]
Sent: Friday, January 05, 2007 11:48 AM
To: eathornton@oaklandnet.com
Subject: Measure DD NOP

ggas.DD.deir.doc (32 KB)

Dear Mr. Thornton:

In the NOP comment letter I sent you yesterday (attached), I inadvertently neglected to refererence one of the principal factors that substantiates the environmental sensitivity and uniqueness of the Lake Merritt Channel (LMC), and that is the fact that, as documented in the City's OSCAR element, the LMC is inhabited by the Barrow's goldeneye, a migratory duck that is also a specie of special concern under the Cal. Endangered Species Act.

Thank you for your consideration of this additional item of information.

John Bowers

January 4, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR Notice of Preparation

Dear Mr. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Notice of Preparation (NOP). The GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly the GGAS is in general strongly supportive of the projects described in the NOP.

However certain aspects of the Measure DD projects pose clear risks to the habitat and natural resource values of the Lake Merritt Channel (LMC) in particular. Because of its constrained size the LMC is more sensitive to disturbance from human activity than is the lake itself. The DEIR needs to carefully evaluate these risks and to develop appropriate mitigation measures to avoid or minimize them.

The risks in question are the following:

1. **CONSTRUCTION-RELATED IMPACTS FROM 10TH AND 12TH ST. RECONSTRUCTION PROJECTS.**

The 10th and 12th St. reconstruction projects will be carried out directly in and adjacent to the LMC. They will involve substantial amounts of highly disruptive activity in the form of demolition, excavation, and grading. The noise and percussive effects from these projects will have a clear and indisputable adverse impact on the natural resource and habitat values of the LMC. During the periods when construction activities are occurring these impacts will in significant portions of the

LMC prohibit migratory and other waterfowl that would otherwise be expected to use the LMC for foraging and resting from doing so.

It is of critical importance that the DEIR acknowledge these impacts and analyze appropriate mitigation measure to reduce if not eliminate them to the maximum extent possible. Such measures should include at minimum confining to the non-migratory waterfowl season of April – September at least those construction activities likely to cause the greatest disturbance to the LMC's habitat values.[1]

2. IMPACTS FROM OPENING THE LMC TO RECREATIONAL SMALL BOAT PASSAGE.

The regionally significant natural resource and habitat values that the LMC currently supports can be attributed in no small part to the fact that it is and has been for decades closed to boat traffic. A recent study performed for the City of Berkeley to assist it in planning for its Aquatic Park documents the disturbance that boating and other human activity can cause to foraging and resting ducks and other birds. The Measure DD projects will open the LMC to small boat passage for the first time in perhaps over a century.

It is critically important that the DEIR evaluate the potential for boat traffic to degrade the high quality waterfowl habitat that the LMC currently supports. It is equally important for the DEIR to evaluate measures to reduce such impact to the absolute minimum. Such measure should include 1) a ban on all motorized boat traffic, and 2) a seasonal closure of the LMC to boat traffic to coincide with the closure of the Trestle Glen arm of Lake Merritt to recreational boating (Nov. 1 – Apr. 1).

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers
Member, East Bay Conservation Committee

[1] As is evidenced by the seasonal restrictions to protect fish habitat on construction activity associated with the new SF Bay Bridge project, such seasonal restrictions are not uncommon.

Thornton, Elois A

From: JOHN BOWERS [jbowers45@msn.com]
Sent: Friday, January 05, 2007 2:06 PM
To: eathornton@oaklandnet.com
Cc: jmpeter@oaklandnet.com
Subject: Measure DD NOP

Aquatic_20Park-finalrpt-V31 1 ...

Dear Mr. Thornton:

I apologize for the duplicate posting earlier today.

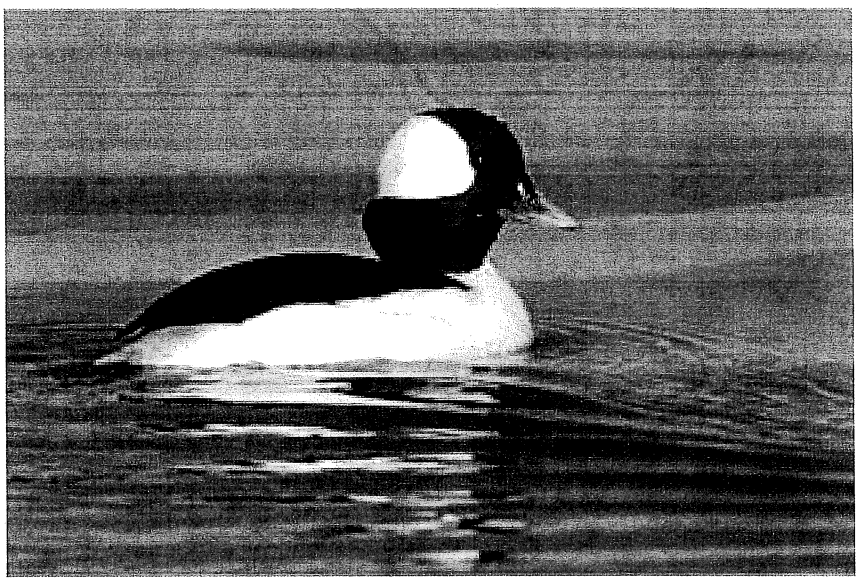
In my NOP comment letter I referred to a bird disturbance study performed for the City of Berkeley. The study is entitled "Aquatic Park, Berkeley, CA: Waterbird Population and Disturbance Response Study (2004)," prepared by Avocet Research Associates of Pt. Reyes Station, CA. An electronic copy of this study is attached hereto. Please incorporate this study in my comments.

Thank you. John Bowers

Aquatic Park, Berkeley, California:

Waterbird Population and Disturbance Response Study

2004



A report prepared for the City of Berkeley

by

Avocet Research Associates
65 Third Street, Suite 25
Point Reyes Station, CA 94956

May 12, 2005

Executive Summary

We conducted 22 waterbird surveys of Aquatic Park during 2004 to determine use patterns, species richness, and waterbird abundances at the site. Additionally, we conducted six disturbance trials during the winter months to estimate flush distances of waterbirds in response to non-motorized watercraft.

Approximately 80 percent of the waterbirds using the lagoon occur during winter months; summer numbers of birds comprised about 20 percent of total abundance. Waterbird numbers swell from October through March almost entirely due to the arrival of rafting waterbirds, especially bufflehead, American coot, and scaup. These three species represented 40 percent of the total waterbirds using the site and comprised the bulk of the rafting waterbird population, as well as the preponderance (72.7 %) of disturbance responses. The greatest numbers of waterbirds were present in the lagoon during winter storm events. Winter months also supported the greatest number of species.

Grouped by class (diving birds, dabbling ducks, waders, and gulls) diving birds comprised more than 50 percent of the waterbird community. Waders are most abundant during migratory periods in late spring and early fall. Dabblers (mallards) breed at the site and are the most abundant waterfowl in June. Gulls account for only a small proportion (~6%) of the total. Several species of long-legged waders (egrets and herons) roost in trees along the shoreline throughout the year.

In general, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon. There may be some movement out of the lagoon if birds are disturbed or if prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary. No movement of waterbirds out of the lagoon due to disturbance was observed in this study.

The winter waterbird community was distributed evenly around the lagoon, but tended to occur in greater numbers in the widest areas in the central and southern half of the lagoon where more habitat was available. Densities of rafting waterbirds did not differ significantly among circulation cells.

Average flush distances (31-36 meters) were similar among three classes—divers, dabblers, and waders. The closest distance at which birds will not flush 95 percent of the time (upper 95% quantile of standard normal flush distance), was calculated as 63-70 meters. The narrow configuration of the lagoon does not afford great opportunity to avoid disturbance to rafting waterfowl, however recommendations to restrict boats to a central lane (~20-m) and to increase vegetative cover along the shoreline should reduce current and future disturbance levels to waterbirds.

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1.0 Scope and purpose of study

The purpose of this study was three-fold:

- to document waterbird use of the Main Lagoon;
- to evaluate disturbance parameters of the waterbird population, and;
- to develop recommendations to minimize disturbance to waterbirds.

To address these goals Avocet Research Associates conducted 22 surveys of rafting waterbirds and shorebirds for one year (January 2004 – December 2004) within and along the shore of the Main Lagoon. The survey data is intended to help identify areas of high waterbird use, develop management guidelines for boating activities, and provide baseline data for future periodic evaluations of the effects of boating on the rafting and foraging waterbirds. Independent disturbance trials were conducted to quantify responses (minimum flush distances) to disturbance by non-motorized watercraft.

2.0 Site description

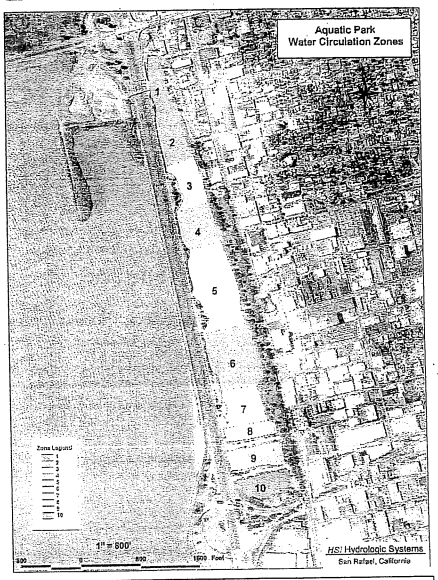
Aquatic Park encompasses 64.8 acres of waterbird habitat in three distinct water bodies: the Main Lagoon (56 acres); the Model Yacht Basin (4.9 acres), and the Radio Tower Pond (3.9 acres). These impoundments were constructed in 1930 and receive muted tidal influence through several culverts that communicate directly to San Francisco Bay (SFB). This study focused on the Main Lagoon, a relatively shallow (<8 feet deep), linear (60-180 meters wide x 1.4 km long) waterbody with unnaturally steep slopes along the shoreline. Although SFB has a tidal range of approximately six feet between mean higher high water and mean lower low water, the tidal range in the main lagoon of Aquatic Park is only 1.4 feet (NRMS, 2003). The tidal range of the Model Yacht Basin is less than one foot. The lagoon is subject to tidal pumping, that is, the tide does not rise and fall in synchrony with the SFB tides, rather there is a lag period and the resident time of tidal water in the lagoon is longer than in unrestricted bay waters. As a result of this muted tidal influence, there is relatively little tidal flat (shorebird) habitat, but open water habitat is consistently available. The NRMS determined that there is stratification of the lagoon in the summer months, but concluded that it is "unlikely that stratification occurs regularly" (p. 34) and therefore does not create severe or persistent anoxic conditions in the water column, a condition that, if persistent, would have a negative effect on waterfowl. In the Main Lagoon water circulation is poorest in the north and south portions. An

earlier study partitioned the lagoon into circulation cells based on the degree of tidal exchange (Figure 1).

Several wetland habitat types are associated with Aquatic Park, however the preponderance of area is characterized as saline open water. Salt marsh, tidal flats, and freshwater marsh are extremely limited in size and structure and provide almost no habitat for characteristic bird species of these respective habitat types. The openness of the shoreline, particularly on the eastern shore that is traversed by a footpath, limits the value of the shoreline as avian habitat. The absence of any barrier or vegetative buffer between the footpath and the shoreline reduces the value of the open water habitat to waterbirds to an unknown degree.

Both the shoreline and the open water are subject to intense and continuous levels of human uses and impacts. The Highway 580 corridor that parallels the lagoon to the west is one of the busiest thoroughfares in the San Francisco Bay area, perhaps in the country. The railroad tracks parallel the lagoon to the east, and these too introduce a consistent and loud source of disturbance to wildlife. Air traffic (commercial airliners accessing Oakland International Airport, helicopters, etc.) is also frequent. Park users along the shoreline participate in a wide variety of activities that create ongoing sources of disturbance to wildlife—running, biking, dog-walking, frisbee, etc. The open water is popular for watercraft especially kayaks and rowing skulls. Waterskiing is permitted in the summer months. Watercraft (specially kayaks and rowing shells) access the lagoon at all times of year and probably introduces the most consistent source of disturbance to waterbirds, especially rafting waterfowl.

Figure 1. Aquatic Park: circulation zones



FROM: AQUATIC PARK NATURAL RESOURCE MANAGEMENT PLAN, 2003

3.0 Definition of Terms

Several terms used in reference to waterbirds require definition.

"Divers" refers mostly to waterfowl, but also includes several other taxonomically distinct species (grebes, cormorants, terns) that generally forage beneath the surface of the water or dive for their food. Scaup (Plate 1) are typical divers; we have included the American coot (Plate 2) in this general category because of its behavior and abundance at the site.

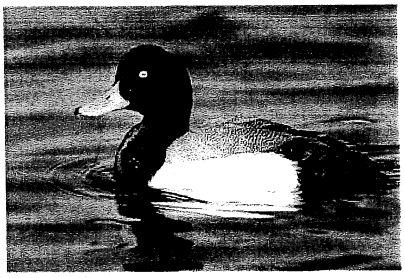


Plate 1. Greater scaup, one of the most abundant species at the site, is a typical "diver."

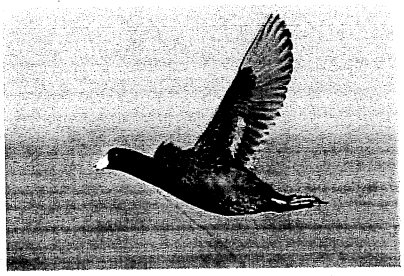


Plate 2. American coot, a member of the *Rallidae* family, is common at Aquatic Park. Its primary foraging methods are diving in shallow water and dabbling near the surface (Taylor 1998). At Aquatic Park it tends to consort with diving ducks.

"Dabblers" refers to surface feeding ducks; they strain algae and other vegetation from the surface, or sometimes "tip-up" to grovel on the bottom for vegetation or benthic infauna (invertebrates).

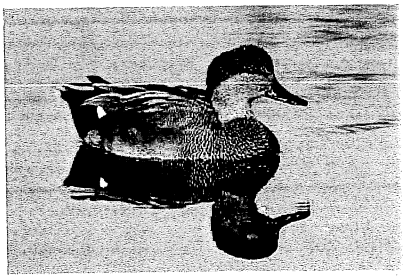


Plate 3. Gadwall, the classic "dabbling" duck, habituates shallow water and feeds at the surface or even on exposed mudflats or grassy shorelines.

"Waders" encompasses a variety of species from various families, all of which forage in shallow water or along shorelines. Waders include "Ardeiids" (egrets, herons, night-herons) and shorebirds (sandpipers, dunlins, dowitchers, etc.).

"Gulls" are separated into their own group because they are opportunists and engage in a variety of feeding strategies. They respond differently to disturbance than any of the other groups, often moving toward, rather than away from, human activity. Terns are often included with the gulls because of a close taxonomic relationship, however here we have grouped the terns with the divers because of their foraging behavior and potential sensitivity to disturbance.

"Species of special concern" is a catchall phrase that includes any species identified by either state (California Department of Fish and Game) or federal (U.S. Fish and Wildlife Service) agencies that require special consideration because of ongoing threats to their populations. This list is continually updated and modified. A list of special status species recorded at Aquatic Park and references to those documents that identify their status is provided in Appendix B.

"Independence" of data or observations means that one sample (or observation) has no influence on the other. Non-independence indicates a cause-and-effect relationship. For example, bufflehead counted in one section of the lagoon may be avoiding gulls in another section, therefore the count data from each section are considered non-independent.

4.0 Methods

Waterbird censuses

ARA biologists conducted 22 comprehensive censuses of the Main Lagoon at Aquatic Park, Berkeley, California at approximate two-week intervals from January through December, 2004 to document total numbers of waterbirds using the lagoon during that period. Each census comprised at least one "absolute count" (Bibby *et al.* 2000) of all birds on the lagoon and shoreline. Because waterbirds may utilize the lagoon differently under different environmental conditions, censuses were scheduled to capture a range of tidal influences and weather conditions (Table 1). The surveys included open water and shoreline habitat as well as vegetated areas adjacent to the lagoon that may have been utilized by waterbirds for roosting.

One to two biologists counted the birds present during a complete tidal cycle on each census. Counts were made from fixed points along the lagoon's shoreline. Birds were identified to species, and each individual or flock was assigned to one of eight "circulation zones" within the lagoon (Figure 1) as delineated by the Aquatic Park Natural Resource Management Plan (NRMP 2003).

To avoid over-counting or under-counting, on approximately one-half of the visits (n=12) a survey consisted of three separate counts: (1) a preliminary overall estimate of the total number of individuals of each species on the lagoon; (2) a sectional count in which each bird was assigned to one of ten circulation cells, eight in the main lagoon, one in the model yacht basin (MYB), and one in the radio-tower pond (RTP); and, (3) a final overall estimate of the total number of individuals of each species on the lagoon. These more comprehensive surveys allowed us to determine if there was significant change in waterbird numbers over the course of a given census period. On the remaining surveys the methods conformed to #2 above, i.e., all birds were assigned to sections but no overall estimate was made; the sectional counts were grouped and totaled post hoc.

If discrepancies were detected between overall estimates and recorded numbers, recounts of selected common species were made. Additionally, movements of individuals or flocks in-and-out of the lagoon, if apparent, were noted and reconciled with overall numbers. Notes on obvious sources of disturbance were also noted. The behavior of each individual or flock was noted on the data entry sheet— roosting, foraging, or flying.

Species were expected to move among various segments of the lagoon, however we assumed that cumulative sightings over the course of the surveys would give an indication of which species occurred in which areas most frequently, thereby providing useful information for developing a plan to help avoid or minimize impacts to sensitive species.

Total observation time was 86 hours (Table 1); the average survey took 3-4 hours to complete. (Some surveys were expanded to cover the entire tidal cycle of 6-hrs, but due to the muted tidal influence in the lagoon it soon became obvious that, other than waders, the waterfowl at Aquatic Park were not responding to tidal levels on San Francisco Bay.)

Table 1. Dates, times and conditions of waterbird surveys conducted at Aquatic Park.

Census #	Date	start	end	mins	Tide	sky	temp °F	wind (kph)	wind dir	boats	spec. cir
1	1/29/04	1515	1645	90	low	ovc	53	3	W	Y	
2	2/4/04	1240	1440	120	high	ovc	56	0-2	NW	N	
3	2/11/04	0701	1147	286	low	clear	42	0-1	E	Y	
4	2/17/04	0659	1034	215	high	ovc	62	2-13	S	N	storm
5	2/25/04	0715	~1448	393	low	ovc	54	8-12	S	N	storm
6	3/11/04	1449	1725	156	high	clear	58	5-7	NW	Y	
7	3/31/04	1315	1820	245	low	65%	57	4-8	W	N	
8	4/14/04	1400	1845	285	high	clear	68	6-7.5	NW	Y	
9	4/23/04	1530	1745	135	high	clear	61	0	na	Y	
10	5/7/04	0733	1037	184	low	50%	65	1-2	S	N	
11	6/9/04	1000	1415	255	low	clear	61	7-10	W	N	
12	7/26/04	0805	1250	285	low-high	ovc	62	2-5	W	Y	
13	8/20/04	0730	1130	240	low	ovc	62	3-5	WSW	N	
14	9/8/04	0810	1225	195	low-high	clear	73	1-3	SW	Y	
15	9/29/04	1200	1610	250	high	ovc	58	1-5	SW	Y*	
16	10/20/04	1030	1445	255	high-low	ovc	59	2-8	W	N	
17	10/28/04	1040	1445	245	high-high	ovc	55	4-6	S	Y	
18	11/12/04	0800	1220	260	high-high	ovc	55	5-8	NW	Y	
19	11/17/04	1000	1400	240	high	clear	65	0-2	W	Y	
20	11/30/04	1440	1715	155	low	40%	52	4-7	N	Y	
21	12/8/04	1345	1625	160	low	ovc	57	5-6	S	N	
22	12/22/04	0740	1230	290	high	20%	52	0	na	Y	
23	2/15/05	1015	~1500	225	low	rain	62	0	na	N	storm

* 3 people working on waterski island
Boats present: 13xs
Boats absent: 10xs

Disturbance trials

Six disturbance trails were conducted between November 15, 2004 and February 15, 2005. The trials were independent of the waterbird surveys. They were conducted on different dates, and were performed when no other watercraft were present on the main lagoon. On each trial a single observer paddled a 21' red, single-person kayak from the dock in Section 7 (Figure 1) northward in the center of the lagoon until the middle of Section 1 was reached, approximately 50-m from the northern shoreline. To assure independence of disturbance events, the observer then waited for 30-minutes before paddling southward along either the eastern or western

shore, back to the dock. Each transect was approximately 1.2 km in length, therefore each trial covered about 2.4 km, or a total of 14.4 km over six trials.

The observer recorded disturbance distance from each species of waterbird that moved away from the craft. Disturbance was defined as the moment at which a bird or flock moved away from the kayak, either by swimming, flying, or diving. The distance to the closest bird in a flock was measured using a laser digital range finder (KVH data scope) and recorded on a portable tape recorder. The data was transcribed to data sheets *post hoc*. "Head alert" behavior is sometimes used as an indication of preliminary disturbance (Burger 1991, Rogers and Smith. 1997). We did not record head alerts because it proved impossible to determine whether the source of the alert response was the kayak or some other stimulus (passing train, dog on the shore, aggression by other birds, etc.). Head alerts were noted as a response of birds farther away from the disturbance source than those that swam, flew, or dived.

Data analysis

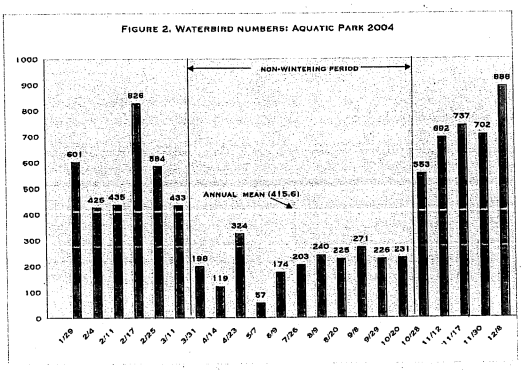
The high degree of site tenacity in wintering waterbirds (Kelly and Cogswell 1979, Evans and Pienkowski 1984, Warnock and Takekawa 1995) results in potentially high correlations between censuses conducted at the same location (Stenzel *et al.* 2002). The inherent non-independence of the data (i.e. presence on one count may predicate presence on another) and the relatively small sample size of this study site placed limits on the validity of significance tests applied to this data set. Nevertheless, strong patterns or differences indicated by the statistical analysis provide a suitable means for evaluating waterbird use of the site. To facilitate comparisons among count areas (sections) of different sizes, and to compare to known values at other Bay Area locations, species abundances were summed, converted into densities (birds/ha), and log-transformed for both species and species groups. Mean abundance values were used to document habitat values and to characterize the waterbird community. Analysis of variance was used whenever the census data met the associated assumptions of analysis to test hypotheses regarding waterbird abundances. Measures of biodiversity—species richness and density values—were calculated for comparison with the few other sites around the bay area for which data are available.

To test the hypothesis that there was a change in waterbird abundance during a given survey period (~4 hrs), we performed a t-test for matched pairs on population estimates made at the start (Survey A) and finish (Survey B) of each of 13 surveys (Survey #s 6-18).

5.0 Results of Waterbird surveys

Seasonal occurrence

Numerous studies have documented the general pattern of seasonal occurrence of waterbirds in the Greater San Francisco Bay area (e.g. Shuford et al. 1989, Takekawa *et al.* 2000, 2001, Kelly and Tappen 1998). The pattern of winter abundance and summer scarcity was mirrored at Aquatic Park (Figure 2). Total numbers of waterbird detections (n=9927) on all censuses (n=22) are graphed in **Figure 2**, below.



The surveys were completed over the course a calendar year, therefore winter numbers (those above the annual mean) represent two different winter seasons, the end of winter 2003-04 and the beginning of winter 2004-05. Although interannual variation in waterbird numbers is to be

expected (Shuford *et al.* 1989, Kelly and Tappen 1998), the generalized winter abundance pattern can be seen in those census results that lie above the annual mean (Figure 2).

During 2004, the arrival of wintering birds occurred rather abruptly. During the two-week period, October 28-November 17, the waterbird population increased three-fold. This increase was accounted for almost entirely by the arrival of bufflehead on November 11 and the arrival of scaup on November 17, a pattern of arrival to be expected most years. However, it is important to note that arrival dates also vary interannually, depending on far-ranging influences such as weather in more northerly latitudes. The build-up in scaup numbers can begin in late-September or early-October; nevertheless, the dates observed in this study mirror a fairly typical Bay Area pattern. Both scaup and bufflehead may depart sites like Aquatic Park unexpectedly during periods of episodic prey abundance on the open bay, most characteristically the herring spawn (Shuford *et al.* 1989). Such local movements may account for the dip in winter numbers on February 4 and 11 (Figure 2).

Like arrival dates, departure dates may vary by a week or two annually. However departure tends to occur more gradually than arrival. In 2004, departure occurred between the March 11 and March 31 surveys, a fairly typical pattern. The two surveys conducted during storm events (February 17 and December 8) also documented the highest number of waterbirds on the lagoon. During those storm surveys, numbers of scaup, coot, bufflehead, and goldeneye peaked (comprising 65% of the total), an indication that Aquatic Park provides refuge for rafting waterbirds when the open water of San Francisco Bay is roiled by winter storms.

To summarize seasonal occurrence: numbers of waterbirds at Aquatic Park swell from October through March almost entirely due to the arrival of rafting waterbirds, also known as "divers." There may be some movement out of the lagoon as prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary. Highest numbers of waterbirds are present in the lagoon during winter storm events.

Movement of waterbirds

We considered the possibility of movement in-and-out of the study area during census periods. If large numbers of birds had entered or left the lagoon during the course of a given survey, either due to disturbance or some daily pattern, it might have biased our findings.

Our analysis found a slight but significant difference between the "before-and after" estimates. On average, numbers declined through each survey period (t_{12}=1.99; P<0.05). However, significance of this decline depended on the departure of one large shorebird flock during census #9. After omitting that census from the analysis, we found no significant evidence of a change in waterbird abundance within survey periods (t_{11}=1.55; P=0.10)

Therefore, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon, a conclusion that agreed with our general impression and was supported by a lack of observations of any large-scale movement. This sedentary tendency is breached during periods of high migratory *zeitgeist*, however. Our anecdotal observations do suggest that the one group that may "commute" more readily from the lagoon to other sites is the gulls, primarily ring-billed gulls. Gulls accounted for only 6 percent of the waterbird abundance, however, and their response to disturbance is not of major concern of this study which is concerned primarily with rafting waterbirds and flocking shorebirds. Although gulls may depart more readily from the lagoon, such departure may not be related to disturbance.

Variance within and between three surveys.

Next, we investigated whether the abundance estimate derived from the sectional surveys differed significantly from the "before-and-after" population estimates. A test of the homogeneity of variance (variance is the square of the standard deviation, used to measure similarity of variation among samples) among the three surveys conducted on each of 12 dates determined that the variances were homogeneous ($F_{9,11}$ = 1.3723; P>0.05) and therefore ANOVA was appropriate. (Again, we eliminated the April outlier survey.) We found no difference among the three consecutive surveys ($F_{2,33}$=0.702; P>0.05). This suggests that there was no significant movement of birds into or out of the lagoon during each census period.

Seasonal abundance

The winter numbers comprised approximately 80 percent of the total detections of waterbirds using the lagoon over the course of the year. Summer numbers of birds comprised about 20 percent of the annual waterbird abundance (Table 2).

Table 2. Waterbird abundance of waterbirds at Aquatic Park, 2004.

Season	n	Mean	se	min-max
Winter (Nov-Mar)	11	617.8	±44.4	425-888
Summer (Apr-Oct)	11	194.4	±19.2	57-271
Overall (Jan-Dec)	22	415.6	±52.4	57-888

Approximately 90 percent of waterbirds were represented by 15 species. Three species—bufflehead, scaup, and coot— represented 40 percent of the total annual abundance; all three were classified as "divers." These three species comprised the bulk of the rafting waterbird community, as well as the preponderance (72.7 %) of disturbance responses. The winter waterbird community was widely distributed around the lagoon, but tended to concentrate in the widest areas in the central and southern half of the lagoon (see "Distribution among sections," below).

The summer population was comprised of a potpourrie of species, about half (51.7%) of which included locally-breeding waterbirds, in order of abundance: mallard (including domesticated ducks), American coot, Ardeiids (herons, egrets, and night-herons) and Forster's tern. In the late summer months a varying array of early migrant shorebirds visited the site, apparently sporadically; their numbers account for 17.8 percent of summer records. Numbers of several of those non-breeding species can be impressive. A high count of 32 snowy egrets and of 86 Forster's terns on August 9, 2004 probably represented use by post-breeding individuals from nearby nesting colonies. The annual high counts of double-crested cormorants occurred on August 9 (44) and September 29 (49), another species that nests in Central San Francisco Bay and apparently uses Aquatic Park as a post-breeding roosting and foraging site. Additionally, a small roosting colony of black-crowned night herons persisted through the summer months; they tended to use the cypress trees on the western shore (Sections 3-5), or the willows in the northeast corner of the RTP (Section 10). Several of the aforementioned species are "Special Concern Species;" their status is discussed in Appendix B.

Deviations from the general seasonal pattern: anomalous surveys

Four of the 22 surveys represented in Figure 2 show apparent anomalous patterns above or below the generalized trend. Proximate causes of those deviations from the norm are explained, as follows:

2/11/04: A dip in the total number of waterbirds on the lagoon was due to the absence of one common species (scaup) that is usually present in winter. The absence of scaup indicates that the local flock may move off site in unison, perhaps in response to a disturbance event on the lagoon or to the availability of some prey source in San Francisco Bay. Scaup tend to congregate in uniform flocks and respond to disturbance and/or foraging opportunities *en masse*.

4/23/04: The late April peak in numbers of birds (Figure 2) resulted from a single flock of 300 shorebirds (mostly western sandpipers and dowitchers) that was roosting along the western shoreline in Sections 6 & 7. This timing corresponds to the peak of shorebird migration through the area and indicates that the west shore of the lagoon does provide a viable roosting site for shorebirds during migratory periods.

2/17/04 and 12/08/04. These two "storm surveys" also accounted for the highest numbers of waterbirds on the lagoon. This correspondence indicates that the lagoon has some value as refuge during storm events, most likely for birds moving in from the South and North basins, the two closest open water habitats on San Francisco Bay.

Species richness

Species richness is simply the number of species using a site. It is a commonly used measure of biodiversity, and provides a useful baseline for future comparison. A total of 50 waterbird species were documented at Aquatic Park during 2004. Additionally, two domestic hybrids were present year-round. A list of all species detected is provided in Appendix A.

The total number of species recorded on a given census is presented graphically in Figure 4. The pattern is similar of that to that of waterbird abundance represented in Figure 2, that is, greatest diversity of species in the winter months and lowest diversity of species in the summer. The peak number of species occurs in mid-winter (December and January) and the nadir is reached in early summer (May-June). This is the pattern of waterbird abundance typical of the region; during the summer months many of these species breed in more northerly areas, or at wetlands in the interior of the continent.

FIGURE 3. WATERBIRD ABUNDANCE LOG-TRANSFORMED

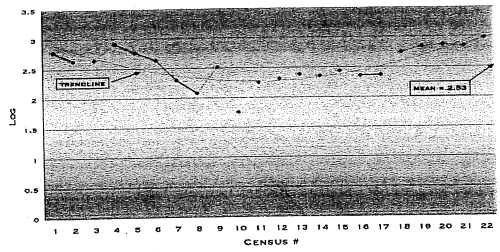
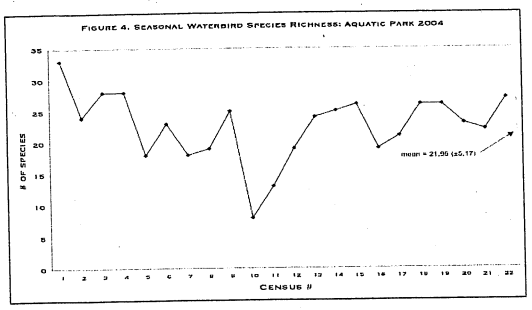


FIGURE 4. SEASONAL WATERBIRD SPECIES RICHNESS: AQUATIC PARK 2004



Bird groups ("guilds") based on foraging behaviour and ecological affinities

For the purposes of data analysis and interpretation, the birds of Aquatic Park were pooled into four broad categories: divers, dabblers, waders (shorebirds and *Ardeids*) and gulls. In addition, several similar species (congeners) were lumped into a single group because of the difficulty of separating them in the field. Therefore, lesser scaup and greater scaup were considered "scaup" and short-billed and long-billed dowitchers were considered "dowitchers." Likewise, small shorebirds of the genus *Calidris* (dunlin, western and least sandpipers) were considered "peeps." Terns are often lumped with "gulls," however their ecological niche is more akin to the divers. These classes are convenient for the purposes of this study, but some species (e.g. Canada goose), do not fit easily into any category.

Grouped by class, diving ducks comprised over half (56.1%) of the mean annual abundance of waterbirds and about 60 percent of the mean winter abundance. Waders are most abundant during migratory periods in late spring and early fall; on an annual basis, they accounted for 27.25 percent of all observations. Dabblers (mallards) breed at Aquatic Park and are the most abundant waterfowl in summer; overall, they accounted for 10.3 % of the waterbirds observed. Gulls account for only 6.3 percent overall (Figure 5).

Figure 5. Waterbird groups at Aquatic Park, 2004

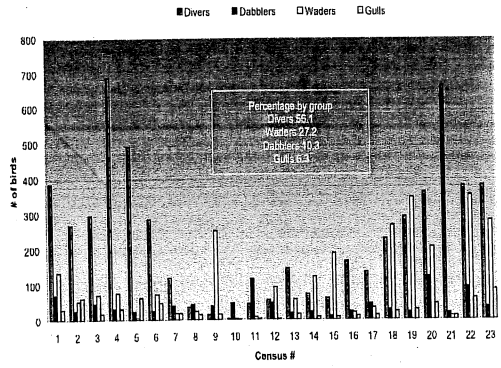


Table 3. Species or species groups that accounted for at least one percent of the total observations are ranked by mean abundances followed by minimum-maximum numbers, and percentage of overall detections.

#	Species	Class	mean ±se	Min-max	Percent (± se)
1	Bufflehead	Diver	114.4 (±17.1)	2-213	14.6 (± 2.4)
2	Dowitcher species (2)	Wader	96.3 (±19.1)	16-170	8.2 (±2.6)
3	American Coot*	Diver*	80.9 (±8.6)	2-138	15.3 (±2.4)
4	Scaup species (2)	Diver	75.9 (±29,7)	2-276	5.8 (±3.6)
5	"Peep" (3 species)	Wader	78.7 (±14.4)	29-142	7.4 (±3.7)
6	Common Goldeneye	Diver	44.6 (± 2.3)	5-91	5.6 (±1.1)
7	Mallard	Dabbler	32.3 (± 5.1)	2-109	7.8 (±2.8)
8	Ring-billed Gull	Gull	26.2 (±5.3)	1-84	5.5 (±1.0)
9	American Avocet	Wader	22.3 (±3.7)	2-42	3.1 (±0.8)
10	Pied-billed Grebe	Diver	16.1 (±1.9)	2-33	3.1 (±0.5)
11	Double-crested Cormorant	Diver	15.8 (±3.6)	1-49	3.0 (±1.4)
12	Forster's Tern	Diver	15.4 (±5.3)	4-89	2.6 (±1.8)
13	Red-breasted Merganser	Diver	11.8 (± 3.7)	1-39	1.1 (±0.5)
14	Snowy Egret	Wader	11.5 (±1.9)	1-32	2.4 (±0.9)
15	Canada Goose	Dabbler	10.6 (±5.9)	1-87	1.6 (±0.6)
16	Ruddy Duck	Diver	9.7 (±4.4)	1-42	1.0 (±0.7)
17	Black-necked Stilt	Wader	6.0 (±3.4)	3-17	1.0 (±0.3)
18	Domestic Mallard	Dabbler	5.2 (±0.7)	1-12	1.0 (±0.4)

*Am. Coot may be classified as either diver or dabbler (Taylor 1998).

The eighteen most common species at Aquatic Park account, on average, for 93.17 (±0.99) percent of the total number of birds using the site. In winter, these dominant species accounted for 95.65 (±0.47) of all detections; in summer for 88.83 (±1.77) percent of all detections.

Other species occur in very small numbers (e.g. hooded merganser), or as single individuals (e.g. green heron). Densities of the most common species are comparable to values at those few other SFB area wetlands for which data is available.

Table 4. Mean winter density (birds/hectare) of the most abundant waterbirds at Aquatic Park compared with other sites. Last row compares overall densities with baywide densities.

Species	Mean (±se)	peak	SFB[1]	SFB[2]	SFB[3]	SFB[4]	OC[5]
Bufflehead	5.1 (±0.8)	9.4	0.9 (6.6)	—	—	—	5.5
Dowitcher	4.3 (±0.9)	7.5	~5.5	—	—	—	—
American Coot	3.6 (±0.4)	6.1	0.57	—	—	—	10.2
Scaup	3.3 (±1.4)	12.2	3.9 (15.4)	8.9	—	—	2.2
Overall	18.3	—	5.0	—	5.0	9.1	—

[1] Goals Project 2000
[2] **Stenzel et al. 2000**
[3] Takekawa et al. 2001 (baylands)
[4] Takekawa et al. 2001 (saltponds)
[5] OC=outer coast; Kelly and Tappen 1998

Limited data are available on waterbird densites from other sites. The few comparisons provided in Table 4, above, suggest that the most common waterbirds at Aquatic Park occur in densities that fall within the ranges of waterbird densities elsewhere. The overall waterbird densities appear to be rather high at Aquatic Park. This apparent concentration is due to high numbers of bufflehead and the small size of the site, which may magnify densities in comparison with other sites. We draw a general conclusion from these comparative data: overall, most waterbird species at Aquatic Park occur in densities relatively similar to those at other sites around the bay, however, each site has its unique characteristics and comparisons are coarse, at best. That said, bufflehead in particular (and, to a lesser degree, common goldeneye) tend to occur in higher densities than in most habitats around San Francisco Bay. Tomales Bay, on the outer coast, supports one of the highest abundances of Bufflehead in California (Kelley and Tappen 1998), and densities there are only slightly higher than at Aquatic Park (Table 4).

Distribution of waterbirds among sections

During each survey, waterbirds were systematically assigned to circulation cells within the main lagoon. The purpose was to determine distribution within the lagoon and to evaluate whether that distribution was determined by physical characteristics for which pre-existing data was available (NRMS 2003). Water depths were not readily identifiable from the surface, but circulation cells were clearly defined in the NRMS report. Abundance values (Y-axis) are plotted against circulation cells of the lagoon ("Section," X-axis) below (Figure 6). The pattern of abundance among cells presents a distinct association with birds more abundant in the central sections (#s 5,6,7) than in the other sections. (Note that the two ponds are included in this analysis (MYB = #9; RTP = #10).

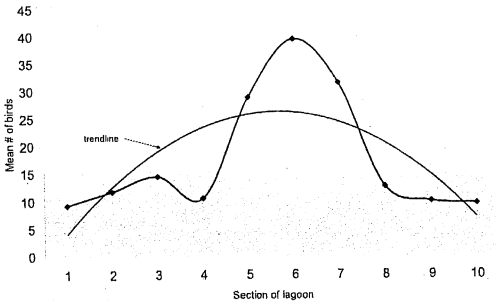
To test the hypothesis that there was a difference in numbers of waterbirds using different circulation zones of the lagoon we examined the variances from the count data. A test of the homogeneity of variance of the total number of waterbirds assigned to each circulation cell (N=8) within the main lagoon found large variance indicating non-homogeneity. Also, for several of the counts the variances were larger than the means, indicating the census data was not

normally distributed. We log-transformed the data prior to analysis to stabilize residual variances.

The log-transformed data (Figure 3) was tested for the homogeneity of variance using the largest and smallest variances. ANOVA found no significant difference among overall the waterbird abundances in the eight circulation cells ($F_{7, 236}$=0.8942, P>0.05).

This conclusion was unexpected, but it might reflect the use of the shoreline by various waders and dabbling ducks; the prime shorebird roosting habitat is in Sections 6 & 7. To address this possibility we proceeded to evaluate use of the cells only by waterbirds that use open water habitats. The abundance of 18 waterbird species classified as "divers" did not differ significantly among the eight circulation cells ($F_{15,12}$=4.132, P>0.05). Although the distribution of rafting waterbird densities within the lagoon was not significant, the untransformed abundance data does show higher use of the centrally located areas of the lagoon, especially cells 5-7 (Figure 6). These cells (#s 5 and 6 in particular) also comprise the largest area and provide the most

Figure 6. Mean number of waterbirds by section



habitat. We did not convert abundances to densities to test this association because the sizes of the cells were not readily available (NRMS 2003). Assignment of birds to cells in the field may have introduced bias, and the distributional pattern was obvious (Figure 6, above). The logical inference is that the configuration of the lagoon and the size of the cells rather than their circulation characteristics. In addition to greater habitat availability, the width of the lagoon in cells 5 and 6 probably provides greater foraging opportunity and the greater distance from shore that rafting waterbirds seem to prefer. This observed distribution is factored into the recommendations, below.

6.0 Result of Disturbance trials

The disturbance trials were performed independently of the waterbird surveys.

Table 5. Disturbance trials: total number of events, all species grouped.

Number of events	Mean flush distance (m)	Standard deviation	Range (m)
286	32.86	18.52	14-50

When the data are partitioned by class, waders, divers, and dabblers are the most prone to disturbance with no significant difference between the three (P>0.05); gulls are less prone to disturbance and those flush distances differed significantly from the other two groups (P<0.01).

Table 6. Flush distances by class.

Group	Number of events	Mean flush distance (m)	Standard error	Range (m)
Waders	34	36.0	3.5	4-56
Divers	208	34.74	1.2	17-51
Dabblers	20	31.00	4.7	10-52
Gulls	24	12.5	1.2	7-18

Waders: The small number of disturbance events affecting waders reflects the relatively low numbers of waders at the site during the trials and the habit of waders to roost along the shore in areas without high levels of disturbance (e.g. Section 6; west shore). Within the wader group, flush distance is related to body size class of each species; egrets and herons typically flush at distances at the high end of the range (50± meters) whereas small flocking shorebirds (e.g. sandpipers) may allow watercraft to pass within 10-m or less. Flush distances may vary with season, however. These distances are derived from winter disturbance trials; during peak migratory periods all waterbirds tend to be more "nervous" and flush more readily than in winter. Also, other studies of shorebirds (but not Ardeids) have shown an increasing sensitivity ather than habituation, i.e., the tendency to be disturbed increases as the number of disturbances increase (Burger 1986). By all accounts, disturbance events are common at Aquatic Park.

Divers: Although the numbers in the table above give a good general picture of flush distances, divers response is dependent on flock size. Larger flocks tend to flush more readily than smaller ones and individual birds are generally much more tolerant of disturbance than flocks (i.e., the Nervous Nellie effect). Bufflehead, the dominant waterbird at Aquatic Park, tends to cluster in

flocks, and therefore their response to disturbance drives the generalized response reflected in Table 6. As with waders, flush frequency increases as the number of disturbances increases. The cumulative effect of repeated disturbance in terms of energy expenditure and depleted fat reserves is unknown. One study in which 17.2 boats per day passed through the study area estimated that waterfowl "may have flown an extra hour each day because of human disturbance" (Korschegen and Dahlgren 1992).

Dabblers: The low number of flush events for dabbling ducks is a function of their behavior; the dominant dabblers (Mallards) tend to congregate along the shoreline of the lagoon, often roosting on the shore, behind the island, or beneath overhanging vegetation. When a watercraft passes, dabblers often paddle slowly toward cover if they were out in the open. This movement away from a watercraft may be considered a "flush," but this response, may be less likely to be noticed by observers because of its furtiveness. Dabblers, like waders, are less likely to occur on open water.

Gulls: Gulls tend to cue on disturbance (wake, *etc.*) and may even move toward rather than away from the source, at least initially. The small mean flush distance found for gulls is expected. Ring-billed gull, the dominant species at Aquatic Park, is among the most habituated to human presence; this is the species commonly found scrounging trash at beaches and parks.

To estimate flush distances of waterfowl, other studies have reported "the upper 95% quantile of standard normal flush distance," that is, the closest distance at which birds will not flush 95 percent of the time [Mean flush distance + (t-distribution $_{0.05,df}$ x sd)]. Rodgers and Smith (1997) added a 40-meter buffer zone to those extrapolated values to allow for unobserved responses prior to flushing. The range of estimated buffer zones are compared in the following table.

Table 7. Flush distances and extrapolated buffer zones based on observed responses of waterbird groups at Aquatic Park. Vales are meters.

Option	A	B	C
Group	Mean flush distance (m)	± $t_{0.05,df}$ x sd	+ 40-m
Waders	36.0	70.3	110.3
Divers	34.7	63.4	103.4
Dabblers	31.0	67.6	107.6
Gulls	12.5	24.5	64.5

These results offer a wide range of distances to inform land use managers in their efforts to minimize or avoid disturbance to wintering waterbirds by watercraft. The mean flush distance (Option A), if implemented as a buffer zone, would avoid disturbance to only a portion (~60%) of waterbirds. The extrapolated values incorporating variance (Option B), would avoid disturbance to 95 percent of the waterbirds. The largest buffer zone (Option C), would avoid virtually all instances of disturbance by watercraft.

The distances in Option C would effectively close the lagoon to watercraft and would not allow enough area for a boat lane. The Option B distances would also essentially close the lagoon, or limit watercraft to a very narrow lane, because of the site's narrow configuration. Using the distances in Option A provides enough room for a functional boat lane, but will cause disturbance to a relatively large proportion of the birds using the site, especially waders and divers, but would reduce disturbance from current levels.

Eliminating disturbances to waterbirds by watercraft is only possible if boating is not permitted in the lagoon. However, reducing or minimizing disturbance is possible and the following recommendations were developed to reduce ongoing levels of disturbance to waterbirds using the lagoon.

7.0 Conclusions and Recommendations

First we will summarize our findings and then develop broad recommendations to minimize or avoid disturbance to the waterbirds that use Aquatic Park.

Waterbird use

- Approximately 80 percent of the waterbirds using the lagoon occur during winter months; summer numbers of birds comprised about 20 percent of the total.
- Waterbird numbers swell from October through March almost entirely due to the arrival of rafting waterbirds, especially bufflehead and scaup.
- Winter months also support the greatest number of species.
- Three species of divers—Bufflehead, Scaup, and American Coot— represented 40 percent of the total watebirds. These three species comprised the bulk of the rafting waterbird population, as well as the preponderance (72.7 %) of disturbance responses. Grouped by class, diving ducks comprised more than 50 percent of the waterbird community. Waders are most abundant during migratory periods in late spring and early fall. Dabblers (Mallards) breed at the site and are the most abundant waterfowl in June. Gulls account for only a small proportion (~5%) of the total.
- The greatest numbers of waterbirds are present in the lagoon during winter storm events.
- There may be some movement out of the lagoon if birds are disturbed or if prey becomes available elsewhere, however wintering flocks tend to be relatively sedentary.
- In general, Aquatic Park waterbirds tend to remain on the site throughout the day with little movement in-and-out of the lagoon and no movement of waterbirds out of the lagoon due to disturbance was observed in this study.
- The winter waterbird community was distributed evenly with regard to densities around the lagoon, but tended to occur in greater numbers in the widest areas in the central and southern half of the lagoon
- The site is used as a roosting site by migrating shorebird flocks, at least in spring (as evidenced by the April 24 census), however the favored roosting area is one of the least disturbed portions of the lagoon.
- Densities of rafting waterbirds did not differ significantly among sections, however waterbird abundances were greater where greater amounts of habitat were available in the centrally located areas of the lagoon, especially cells 5-7 (Figure 6).

Disturbance parameters

- Based on several hundred independent disturbance events, the mean flush distance for all groups (except gulls) was in the 31-36 meter range and the high-end distance was in the 51-56 meter range. The upper 95 percent confidence-level flush distance was in the 63-70 meter range.
- Flush distances tend to be larger for larger species and smaller for smaller species.
- Disturbance sensitivity is positively related to flock size, therefore greatest when numbers of waterbirds are highest.
- Flush frequency is positively related to the frequency of disturbance, however some species or individuals may habituate (Mazluff *et al.* 1992).
- When a watercraft moves down the middle of the lagoon, waterbirds tend to move to the edges and the ends; also, the water behind (west of) the centrally located island is often used as a refugial area.
- Dabblers take refuge along the shore under overhanging vegetation.
- Waterbird distribution at the site is probably determined more by the configuration of the lagoon and available habitat rather than depth, circulation cells, or any other physical parameters.
- The background level of disturbance at Aquatic Park is very high; sources include noise associated with air and road traffic, pedestrian use of pathways as well as upland and shoreline (especially along the east shore), passing trains as well as watercraft. However, waterbirds may remain sensitive (rather than habituate) to direct disturbance.
- There is no way to know which species or what abundances of waterbirds the site might support if disturbance levels were lower.

Recommendations

To reduce or minimize watercraft disturbance:

1) Create a lane down the center of the lagoon (1/3 the width in the narrowest section, or ~20-m) that relegates boats to a confined area and leaves open water habitat between the lane and the shoreline available to waterbirds. This would also avoid, or minimize, disturbance of birds along the shoreline. Eliminating disturbance entirely is not possible while allowing watercraft use.

2) Concentrate boat use during periods of lowest bird use (April- September) and limit boat use during periods of maximum bird presence (October-March).

3) Limit use, or assign time periods, so that use within that lane is maintained at a level that does not further reduce waterbird use.

4) If racing shells are allowed in the lagoon, request that the tiller handles the coxswain use to beat out the stroke be padded. This will reduce percussive noise disturbance that would mimic gunfire to hunted waterfowl (like scaup).

5) Move the dock northward (~30 m) to increase the area in Section 8 available to waterbirds that are moving away from the boat launching activity.

To reduce or minimize land-based disturbance:

1) Plant willows or some other (preferably native) vegetative screen along portions of the eastern shore. These would provide refuge for roosting waterbirds (e.g. night-herons) as well as increase refuge for dabblers and habitat for migrant songbirds. Screening would also provide added protection and perhaps reduce disturbance events to birds on the open water.

2) Fence portions of the eastern shore to restrict, or eliminate, access by dogs and people to the immediate shoreline. Dense vegetative ground cover or shrubbery might also limit shoreline activity by people and dogs. Recommended set back 10 meters, minimum. This would not only protect the shoreline, but also increase the value of the open water between the boat lane and the shore, buffering it from shore-based activities.

3) Fence off the willow patch in the northeast corner of the RTP to protect the existing night-heron roost from people who enter the thicket frequently.

Discussion of Recommendations

Aquatic Park is an urban park. Urban parks serve as reservoirs for native species in densely populated areas (Baker and Graf 1989, Goode 1991, Marzluff *et al.* 2001). Because natural settings are scarce in urban environments, parks are highly valued and heavily visited by humans and wildlife alike. Studies of parks and natural areas have documented that human disturbance of bird species can have detrimental effects at individual, population, and community levels (Klein 1993, Rodgers and Smith 1995, Fernandez-Juricic and Telleria 2000). Marzluff *et al.* (2001) discuss improvements in park design that that can reduce the negative impacts of bird-human interactions and increase the tolerance by birds to intense human activity.

As those studies point out, bird tolerance can be estimated by flush distance; the larger the flush distance the less the tolerance. Such flush distances may be used to determine appropriate estimates of disturbance buffer-zones or set-back distances to reduce the effect of human disturbance on wildlife. One of their (and our) primary recommendations is an increase in the complexity of habitat structure. Vegetative screens along the shoreline are an example of

increase habitat structure that would likely reduce disturbance to birds using both the shoreline and open water habitats. Flush distances can also be used to gauge the relative size of barriers and habitat patches that might produce a positive response in the avian population. Because all of the species of concern in this study showed a remarkably uniform response in the 30-50 meter range (63-70 meter upper 95 percentile range), those values should be used to determine ideal buffer-zones and/or set-backs.

Some studies recommend distances larger than observed flush distances as a safety factor (e.g. Rodgers and Smith 1997). However, the linear configuration of the lagoon and the surrounding park land limit the opportunities to increase the size of buffer zones at Aquatic Park, therefore, the distances recommended here are considered minimum values.

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Appendix A. Aquatic Park waterbirds, 2004.

Code	Common Name/ scientific name
CAGO	Canada Goose Branta canadensis
GADW	Gadwall Anas strepera
MALL	Mallard Anas platyrhynchos
CANV	Canvasback Aythya valisineria
REHE	Redhead Aythya americana
TUDU	Tufted Duck Aythya fuligula
GRSC	Greater Scaup Aythya marila
LESC	Lesser Scaup Aythya affinis
SUSC	Surf Scoter Melanitta perspicillata
BUFF	Bufflehead Bucephala albeola
COGO	Common Goldeneye Bucephala clangula
BAGO	Barrow's Goldeneye Bucephala islandica
HOME	Hooded Merganser Lophodytes cucullatus
RBME	Red-breasted Merganser Mergus serrator
RUDU	Ruddy Duck Oxyura jamaicensis
PBGB	Pied-billed Grebe Podilymbus podiceps
HOGR	Horned Grebe Podiceps auritus
EAGR	Eared Grebe Podiceps nigricollis
BRPE	Brown Pelican Pelecanus occidentalis, SE, FE (californicus)
DCCO	Double-crested Cormorant Phalacrocorax auritus
PECO	Pelagic Cormorant Phalacrocorax pelagicus
GBHE	Great Blue Heron Ardea herodias
GREG	Great Egret Ardea alba
SNEG	Snowy Egret Egretta thula
GRHE	Green Heron Butorides virescens
BCNH	Black-crowned Night-Heron Nycticorax nycticorax
AMCO	American Coot Fulica americana
BBPL	Black-bellied Plover Pluvialis squatarola
SEPL	Semipalmated Plover Charadrius semipalmatus
KILL	Killdeer Charadrius vociferus
BNST	Black-necked Stilt Himantopus mexicanus
AMAV	American Avocet Recurvirostra americana
GRYE	Greater Yellowlegs Tringa melanoleuca
WILL	Willet Catoptrophorus semipalmatus
MAGO	Marbled Godwit Limosa fedoa
WESA	Western Sandpiper Calidris mauri
LESA	Least Sandpiper Calidris minutilla
DUNL	Dunlin Calidris alpina
SBDO	Short-billed Dowitcher Limnodromus griseus
LBDO	Long-billed Dowitcher Limnodromus scolopaceus
MEGU	Mew Gull Larus canus
RBGU	Ring-billed Gull Larus delawarensis
CAGU	California Gull Larus californicus
HEGU	Herring Gull Larus argentatus
WEGU	Western Gull Larus occidentalis
GWGU	Glaucous-winged Gull Larus glaucescens
CATE	Caspian Tern Sterna caspia
COTE	Common Tern Sterna hirundo
FOTE	Forster's Tern Sterna forsteri
BEKI	Belted Kingfisher Ceryle alcyon

Appendix B. Listed species detected at Aquatic Park during the 2004 field season.

Several species recorded at Aquatic park are included on official lists of rare, threatened or endangered species. The source of their listing is the California Department of Fish and Game's California Natural Diversity Database (CNDDB) list of "Special Animals" (January 2004) and includes those species:

- Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts.
- State or Federal candidate for possible listing.
- Taxa which meet the criteria for listing, even if not currently included on as described in Section 15380 of the California Environmental Quality Act Guidelines. (More information on CEQA is available at **http://ceres.ca.gov/topic/env_law/ceqa/guidelines/**
- Taxa considered by the Department to be a Species of Special Concern
- Taxa that are biologically rare, very restricted in distribution, declining throughout their range, or have a critical, vulnerable stage in their life cycle warrants monitoring.
- Populations in California that may be on the periphery of a taxon's range, are threatened with extirpation in California.
- Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands, vernal pools, etc.)
- Taxa designated as a special status, sensitive, or declining species by other state or federal agencies, or non-governmental organization (NGO).

Additional information on the CNDDB is available on the Department of Fish and Game web site at **http://www.dfg.ca.gov/html/database.html**.

California Brown Pelican (*Pelecanus occidentalis californicus*)
As a state endangered, federally endangered, and USFWS Migratory Nongame Bird of Management Concern, the California brown pelican is ranked as "apparently secure [with] some factors existing to cause concern such as narrow habitat or continuing threats" (CDFG 2000). Rookery sites are of primary concern; none exists in SFB, since brown pelicans don't breed in Northern California. All brown pelicans observed in the area are nonbreeding or immature birds. Population impacts to brown pelicans have been the result of pesticide-induced eggshell thinning, oil spills, overharvest of prey, and loss of postbreeding roosting habitat (USFWS 1992). In the SFB, pelicans forage over deep-water habitats and roost on structures such as breakwaters, pilings, and, to a lesser extent, salt-pond dikes. Brown pelicans feed almost exclusively on fish. Outside of the breeding season, brown pelicans are most abundant throughout waters of Central and San Pablo bays, but also occur commonly in the South Bay. Brown pelicans occur at the study site as rare fall and winter (September through March) visitors. The largest pelican roost within SFB is located on the breakwaters south of Naval Air Station Alameda. At Aquatic Park, brown pelicans were noted on only one survey: three individuals on August, 9, 2004.

California Least Tern (*Sterna antillarum browni*)
The California least tern is listed as endangered under FESA and CESA and is also state fully protected. Least terns arrive at nest territories in Northern California in early May and usually

depart by mid-October. Least terns feed in relatively shallow, nearshore waters and coastal freshwater ponds, channels, and lakes. Prey taken in California includes anchovy, silversides (*Atherinops* sp.), and shiner surfperch (Zeiner et al. 1990). Least terns nest on barren to sparely vegetated sites usually associated with sandy to gravelly substrate. In the Bay, least terns most commonly nest on flat, artificial terrain such as bay fill sites and abandoned salt ponds. Sites colonized by nesting least terns are relatively free of human or predatory disturbance. The former Alameda Naval Air Station and the Pittsburg PG&E plant are the only known Bay Area nesting sites still producing fledglings. In 1995, one to three pairs of least terns found nesting at the Oakland Airport failed to produce nestlings due to red fox and feral cat predation. In the past, California least terns were documented breeding at Bair Island and various salt pond levees in the South Bay. After breeding, birds tend to disperse to calm water foraging areas where fish are abundant. Least Terns occur along the Alameda shoreline in spring summer and fall, although they were not detected at Aquatic Park during the 2004 surveys. Least Terns occur regularly in summer at North Basin, Ceasar Chevez Park in Berkeley.

American Peregrine Falcon (*Falco peregrinus anatum*)
This raptor has been recently delisted from FESA, but is still listed as a State Endangered species (CDFG 2000). Peregrines are also a USFWS Migratory Nongame Bird of Management Concern and 'fully protected' by CDFG and ranked as "rare; restricted range" in the CNDDB. As a result of pesticide-induced eggshell thinning, the American peregrine falcon population began to decline in the late 1940s. Recent conservation and recovery efforts have resulted in the delisting of this species from FESA. Peregrines generally nest on protected ledges of high cliffs in woodland, forest, and coastal habitats. However, pairs are also known to nest on human-made structures such as bridges and buildings. In recent years, two pairs of peregrines have been known to nest on the Bay Bridge. Peregrines occur along the Alameda Co. shoreline,with some regularity and several "fly-bys" were noted at Aquatic Park during the course of this study. No foraging on the lagoon was observed.

Barrow's Goldeneye *(Bucephala islandica*
Barrow's Golden eye is a Species of Special Concern (CDFG) with protection of its nesting habitat of primary concern. Barrow's Goldeneyes are essentially extirpated from California as a nesting species; formerly bred in timbered lakes of the high Sierra-Cascade. Winter visitors are rare in the SFB area. One bird was present at Aquatic Park on December 8, 2004.

Black-Crowned Night Heron *(Nycticorax nycticorax)*
Rookery sites for black-crowned night herons are listed as areas of concern (CDFG 2000). Important nest sites around SFB are at Artesian Slough, West Marin Island, and at one time, at Bair Island. Four of 11 identified colonies and 53 percent of all nests in the Bay were on islands in the Central Bay (West Marin, Brooks, Alcatraz, and Red Rock), all of which are north of the Bay Bridge. Both red fox predation (at nest sites) and the toxicity of substrate pose a threat to this species (Kelly 1993; Goals Project 1999). Black-crowned Night-herons were detected on 18 of 22 (82%) of the 2004 Aquatic Park surveys in 2004 with a high count of eleven birds. There is a traditional roost in the willows NE corner of the RTP which should be protected from human intrusion. Birds also roost in the cypress trees on the west shore of the main lagoon.

California Gull (*Larus californicus*)
This gull is a Species of Special Concern (CDFG), and the protection of its nesting habitat is also of concern. California gulls have recently colonized the Bay region as a breeding species.

In 1982, 30 pairs were discovered nesting at Knapp Tract in the South Bay on small islands (submerged dikes) near Alviso. By 1994, that colony had grown to 4,000 pairs. Satellite colonies have developed in the area of Newark and Mowry sloughs. Red fox predation has reduced their numbers in recent years. California Gulls were detected on 6 of 22 (27%) of surveys at Aquatic Park in 2004 with a high count of six birds.

Caspian Tern (*Sterna caspia*)
Nesting colonies of caspian tern are of concern; however, this species is listed as "demonstrably secure; commonly found throughout its historic range" (CDFG 2000). Active South Bay and Central Bay colonies are located at Coyote Hills (west levee), Alviso Pond A7, Hayward Shoreline, Ravenswood Slough, Brooks Island, and Naval Air Station Alameda (Goals Project 19990. Caspian terns are fairly common to common in late spring and summer in SFB, however they were recorded at Aquatic Park on only one survey: 3 birds on April 14, 2004.

Double-Crested Cormorant (*Phalacrocorax auritus*)
The double-crested cormorant is a CDFG species of special concern. Also of concern are their rookery sites. Rookeries are located on the San Mateo and Richmond-SanRafael bridges. This species declined in abundance with sardine population declines, but is recovering lately due to protection and nearshore ecological changes as described by Sydeman et al. (in press). As of 1990, approximately 2,900 pairs nested around the Bay in nine colonies. Their major prey item is fish, although some crustaceans and amphibians have been taken (Zeiner et al. 1990). This species is known to forage year-round in waters of Alameda County and other open-water areas of SFB. This cormorant was recorded on 82 percent of the surveys with a high count of 44 birds on August 9. It roosts and forages at the site regularly. The waterski jump and the island are favored roost sites.

Forster's Tern (*Sterna fosteri*)
The nesting colonies of this species are protected by the CDFG. The species is listed, however, as "demonstrably secure; commonly found throughout its historic range" (CDFG 2000). Locally, Forster's terns can be found nesting in the southern portion of the Bay on islands in salt ponds, sloughs, and marshes. Forster's terns commonly forage over nearshore waters of Alameda County and are fairly common at Aquatic Park. They were detected on 73 percent of the 2004 surveys at Aquatic Park in 2004 with a high count of 86 on august 9. they were most common during the summer months.

Great Blue Heron (*Ardea herodias*)
The great blue heron is listed as "sensitive" by California Department of Forestry with rookery sites of concern (CDFG). Known rookeries are located north of the Bay Bridge and south of San Mateo Bridge (Kelly et al. 1993). This species is fairly common at Aquatic Park, recorded on 36 percent of the surveys with a high count of 11 birds on August 20th. Birds most often forage along the shoreline or roost on the island.

Osprey (*Pandion haliateus*)
Ospreys are listed as a California Special Concern species (CDFG) with a "demonstrably secure" population. Their nesting sites are of primary concern; none has been observed or is known to nest in Alameda County. Most osprey nests in the Bay region are in the North Bay (Marin County). None were detected at Aquatic Park in the course of the 2004 surveys, however one has been seen foraging at the site over Section 8 (E. Strauss, pers. comm.).

Salt Marsh Common Yellowthroat (*Geothlypis trichas sinuosa*)
The salt marsh common yellowthroat is a California Special Concern species (CDFG 2000), mostly resident in fresh and brackish marsh habitat surrounding the Bay, moving into saline tidal marshes in winter. The salt marsh common yellowthroat population has been reduced by 80-90 percent in the past 100 years due to loss of suitable habitat, with this diminution most exacerbated in the South and Central Bay. One yellow throat was hear singing on the April 24 survey; a likely migrant. An increase in willow and shrubbery habitat at the site would increase the viability of the park for this and other migrant insectivores.

Snowy Egret (*Egretta thula*)
Rookery sites of snowy egrets are of concern, although none occurs in vicinity of Aquatic Park. The nearest major breeding sites are at Artesian Slough, Alviso, and West Marin, and at one time at Bair Island (Goals Project 1999). Snowy egrets may congregate in large numbers in salt ponds and seasonal wetlands in response to fish availability. At Aquatic Park they forage in shallow water along the shoreline and roost in trees that overhang the shallows. Snowy egrets were common at Aquatic Park, present on 91 percent of the surveys with a high count of 32 on August 9.

Appendix C. Aquatic park: incidental field notes.

02/11/04
Great Blue Heron flushed from *Scirpus* by hiker (Section 5).
Three dogs ran onto shoreline flushing shorebirds (Sec. 6).
Three skulls present throughout survey, sometimes rowing three abreast.
Two-person kayak on west edge; on e-edge, person polling around on raft.
Song Sparrow (*M.m. pusillula*?) gathering nesting material (Sec. 10).

02/17/04
Storm survey: rain all day yesterday; 6.6" tide at 0631 hrs; wind peak 13.7 knots.
Some dogs off-leash.
Birdwatcher at southend.
Throughout morning did not see any large groups of birds move around lagoon or in-out from bay.

03/11/04
Three boats present during survey: 1500-1649 hrs.

03/31/04
Person walking around Pond #10; Night-Heron roost obscured by foliage.
Two skulls on main lagoon throughout survey.

04/23/04
Mallard with 6 downy chicks; another with 11 chicks.
Peregrine Falcon flew over flushing smaller shorebirds.
Very warm: m any people and dogs out on east trail.
Two kayaks on main lagoon during survey.

05/07/04
Section 6 had no birds onit; two dogs running loose on the west shore.
"Frisbee harvester" walking directly on edge of east shore (Sec. 6).
Common yellowthroat singing in SE corner of Plexxicon parking lot.
Two western gull copulating on waterski island.

06/09/04
At least three borrds of Mallards.

07/26/04
Red-shouldered Hawk chasing Cooper's hawk east of Sec. 8.
One scull present throughout survey; three different rowers.

08/09/04
Train @ 0800; decibel level 83-100.
Power boat enters water via ski launch (CF 8710 PL)
Halfway through count water skiers came through Area 7, flushing some shorebirds.
14 Forester's Terns persisted in mid-lagoon right next to active water skiing.
Large Red-eared Slider [non-native turtle] on lawn near SE corner of main lagoon.

08/20/04
Three skulls in water at start.
One Common Tern [rare here] on Water Ski Island.
Feeding school of several hundred fish jumping and swimming in shallows across from rowing club; cormorants, snowy egret, great-blue heron, greater yellowlegs and willet foraging in water around fish.

09/29/04
Where are all the mallards?
Pond #10 smells abominable.

10/20/04
Dave Ritter accompanies Emilie on survey.
Osprey foraging over Section 8.
No exposed mudflat; heavy rains have raised water level; all shorebirds are roosting on rowing club dock.

10/28/04
20 American Avocets roosting at beginning of survey flushed by off-leash dogs at 1255; some returned to roost later.
One skull and one canoe on water at start of survey.

11/12/04
Four skulls on lagoon at start of survey; one present at end.
About 60 dowitchers circled and returned when dog walker approached shorebird area.
During the course of survey many small groups of Bufflehead and common Goldeneye flying back-and-forth across lagoon as skulls disturb them.

11/17/04
Merlin fly by!
Five kayaks.

11/30/04
Woman arrives and feeds mallards 3 large bags of bread.
Kayak paddles w/in 10-m of water ski island and flushes 32 cormorants.

12/22/04
One Snowy egret flushed from shore by ball thrower/dog.
200 shorebirds flushed from west shore (Sec 7); flew short distance and returned.
One skull at beginning of survey; none at end.

Golden Gate Audubon Society
2530 San Pablo Avenue, Suite G • Berkeley, California 94702
Phone: (510) 843-2222 • Fax: (510) 843-5351 • Email: ggas@compuserve.com
Americans Committed to Conservation • A Chapter of the National Audubon Society

January 4, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR Notice of Preparation

Dear Mr. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Notice of Preparation (NOP). The GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly the GGAS is in general strongly supportive of the projects described in the NOP.

However certain aspects of the Measure DD projects pose clear risks to the habitat and natural resource values of the Lake Merritt Channel (LMC) in particular. Because of its constrained size the LMC is more sensitive to disturbance from human activity than is the lake itself. The DEIR needs to carefully evaluate these risks and to develop appropriate mitigation measures to avoid or minimize them.

The risks in question are the following:

1. **CONSTRUCTION-RELATED IMPACTS FROM 10TH AND 12TH ST. RECONSTRUCTION PROJECTS.**

The 10th and 12th St. reconstruction projects will be carried out directly in and adjacent to the LMC. They will involve substantial amounts of highly disruptive activity in the form of demolition, excavation, and grading. The noise and percussive effects from these projects will have a clear and indisputable adverse impact on the natural resource and habitat values of the LMC. During the periods when construction activities are occurring these impacts will in significant portions of the LMC prohibit migratory and other waterfowl that would otherwise be expected to use the LMC for foraging and resting from doing so.

It is of critical importance that the DEIR acknowledge these impacts and analyze appropriate mitigation measure to reduce if not eliminate them to the maximum extent possible. Such measures should include at minimum confining to the non-migratory waterfowl season of April – September at least those construction activities likely to cause the greatest disturbance to the LMC's habitat values.[1]

2. **IMPACTS FROM OPENING THE LMC TO RECREATIONAL SMALL BOAT PASSAGE.**

The regionally significant natural resource and habitat values that the LMC currently supports can be attributed in no small part to the fact that it is and has been for decades closed to boat traffic. A recent study performed for the City of Berkeley to assist it in planning for its Aquatic Park documents the disturbance that boating and other human activity can cause to foraging and resting ducks and other birds. The Measure DD projects will open the LMC to small boat passage for the first time in perhaps over a century.

It is critically important that the DEIR evaluate the potential for boat traffic to degrade the high quality waterfowl habitat that the LMC currently supports. It is equally important for the DEIR to evaluate measures to reduce such impact to the absolute minimum. Such measure should include 1) a ban on all motorized boat traffic, and 2) a seasonal closure of the LMC to boat traffic to coincide with the closure of the Trestle Glen arm of Lake Merritt to recreational boating (Nov. 1 – Apr. 1).

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers
Member, East Bay Conservation Committee

[1] As is evidenced by the seasonal restrictions to protect fish habitat on construction activity associated with the new SF Bay Bridge project, such seasonal restrictions are not uncommon.

From: Dr. Bailey [lmi@netwiz.net]
Sent: Wednesday, December 27, 2006 11:42 AM
To: eathornton@Oaklandnet.com; Kerry Jo Ricketts Ferris; driley
Subject: DD EIR

Greetings: Having not seen (or mis-placed?) the scoping notice, I am unsure if the EIR includes all DD projects, or is focused only on the tree issue. If it will consider all DD projects, please consider the following comments in preparation of the EIR.

Background: I was part of the Master Plan team that preceded DD and assisted (with regard to Lake Merritt water quality projects) in developing the DD language. For the last ten year or more I have occupied an office at 568 Bellevue - The Sailboat House. I understand that renovation of this building has been postponed to phase II or III.

Comments: The master plan and DD call for returning 568 Bellevue to its original architectural form, which includes replacing the secure, fenced storage area between garages with a new entrance to the street, new windows on the street side etc. This is all well and good, except there are other, much more pressing issues here that far outweigh the importance of those recommendations. For example:

1. The bulkhead wall facing the Lake is sinking and needs to be rebuilt. The same thing happened at the Nature Center a few years ago.
2. There is no clean out opening in the sewer line from the bathrooms to the sewage pump at geodesic dome. This is a long, flat sewer that sometimes backs up. A clean out opening, located mid-way, is a much needed improvement. Check with the Public Works guys that try to clean it.
3. The bathrooms are VERY MUCH in need of renovation, especially the mens room.
4. Energy efficient light switches on sensors or timers would save the city a lot of money. Lights in the rental room are often left on.
5. How about a solar and/or a green roof?
6. Two classrooms leak water through the floor! Both the main classroom and the one below me are wet when rains are heavy.
7. There is no heat in any of the four classrooms.
8. There is no electric power on the docks. This requires long extension cords to pump out the boats; prevents active bird control actions, reduces security (no lights) etc.

My suggestion for renovation of this site would be to fix the above listed problems, and to:

Level the existing linear garages and main classroom and replace them with a two story building on the same footprint. This could provide badly needed boat storage, more office and classroom space and a laboratory for the Oakland High Environmental Academy that studies marine life in the Lake here every week. The master plan team objected to this, saying it would block the view of the Lake from Bellevue Avenue. But this view is already blocked by trees, and people do not turn their head 90 degrees to look in this direction when driving (they watch the road). Such a new building would bring the existing classrooms up to code and allow expansion of educational opportunities.

When the master plan was being written, Harry Edwards was in charge of Parks & Recreation. He forbid any staff, including the director of the Boating Center, from talking with the planning team. He also blew off two meetings with the team and never did meet with them. In my opinion, that is why the problems listed above were not included in plan recommendations.

Funds like DD only come along once in several decades. It would be foolish to make something prettier (in the eyes of some beholders) when all these problems need to be fixed first.

Since Dana is in charge of the Boating Center, I am probably speaking out of turn, and her views on these comments should take priority.

Hopefully these recommendations can be addressed in the EIR and the next round of DD plans.

Dick Bailey

file://H:\Measure DD Project\NOPComments\NOPComment.FrDrDickBailey.htm 12/29/2006

APPENDIX D

TABLE OF RELATIONSHIP OF PROJECT TO RELEVANT PLANS AND POLICIES

Table 1: Relationship of Project to Relevant Plans and Policies

Policy #	Policy	Relationship
City of Oakland General Plan, Land Use and Transportation Element		
Industry and Commerce Policies		
Policy I/C3.5	**Promoting Culture, Recreation, and Entertainment.** Cultural, recreational and entertainment uses should be promoted within the Downtown, particularly in the vicinity of the Fox and Paramount Theaters, and within the Jack London Square area.	*Lake Merritt and Lake Merritt Channel:* Several Measure DD components would provide increased recreational opportunities around Lake Merritt and the Channel. *Waterfront Trail:* The Waterfront Trail components would fill in gaps in the Bay Trail, providing recreational opportunities near Jack London Square. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Transportation and Transit-Oriented Development Policies		
Policy T2.5	**Linking Transportation and Activities.** Link transportation facilities and infrastructure improvements to recreational uses, job centers, commercial nodes, and social services (i.e., hospitals, parks or community centers).	*Lake Merritt and Lake Merritt Channel:* Several infrastructure improvements are proposed for the Lake Merritt/Lake Merritt Channel area (see Chapter III for additional details). These improvements would result in a net increase in park area around Lake Merritt. *Waterfront Trail:* The existing parking area at the 66th Avenue Gateway would be upgraded and improved. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy T3.5	**Including Bikeways and Pedestrian Walks.** The City should include bikeways and pedestrian walks in the planning of new, reconstructed, or realized streets, wherever possible.	*Lake Merritt and Lake Merritt Channel:* Improved bikeways and pedestrian trails are included in this group of improvements. *Waterfront Trail:* This group of improvements would complete the Bay Trail, allowing for increased bicycle and pedestrian use. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy T4.7	**Reusing Abandoned Rail Lines.** Where rail lines (including siding and spurs) are to be abandoned, first consideration should be given to acquiring the line for transportation and recreational uses, such as bikeways, footpaths, or public transit.	The reuse of abandoned rail lines would not be incorporated into the Measure DD components.
Policy T4.10	**Converting underused Travel Lanes.** Take advantage of existing transportation infrastructure and capacity that is underutilized. For example, where possible and desirable, convert underused travel lanes to bicycle or pedestrian paths or amenities.	*Lake Merritt and Lake Merritt Channel:* The following roadway changes are proposed as part of Measure DD: the existing 12th Street 12-lane divided roadway would be converted into a 6-lane roadway, increasing parkland around Lake Merritt; the existing lane configuration for Lakeshore Avenue would be reduced to allow on street bicycle lanes; the southernmost couplet of El Embarcadero would be closed to accommodate a multi-use trail and plaza; and Lakeside Drive would be re-striped to accommodate on-street bike lanes.. *Waterfront Trail:* N.A.; *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy T6.2	**Improving Streetscapes.** The city should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches, and other support facilities.	*Lake Merritt and Lake Merritt Channel:* Streetscape improvements, including new landscaping and pedestrian trails, are proposed around Lake Merritt and Lake Merritt Channel. *Waterfront Trail:* The Waterfront Trail group would include a variety of informational signs, benches, and lighting. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy T6.3	**Making Waterfront Accessible.** The waterfront should be made accessible to pedestrians and bicyclists throughout Oakland.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The Waterfront Trail components would complete the Oakland portion of the Bay Trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Downtown Policies		
Policy D1.8	**Planning for the Channel Park Arts, Educational, and Cultural Center.** The area south of Lake Merritt that includes Laney College, the Henry J. Kaiser Auditorium, the Oakland Museum, and Alameda County offices should be enhanced as a walkable, bicycle-friendly educational, cultural and institutional center in downtown Oakland. Efforts to strengthen this area's identity and create transportation linkages with the Jack London Waterfront, City Center, and the Financial District, and BART should be promoted.	*Lake Merritt and Lake Merritt Channel:* Lake Merritt Channel improvements include enhancing bicycle and pedestrian access to the area. *Waterfront Trail:* N.A.; *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy D3.2	**Incorporating Parking Facilities.** New parking facilities for cars and bicycles should be incorporated into the design of any project in a manner that encourages and promotes safe pedestrian activity.	*Lake Merritt and Lake Merritt Channel:* Several Lake Merritt components incorporate parking, including the Municipal Boat House, the Sailboat House, Bellevue Avenue and Lakeshore Avenue improvements. The Public Works Department would review the plans prior to construction to ensure pedestrian safety. *Waterfront Trail:* Parking areas would be incorporated into several of the park areas along the Waterfront Trail, including Estuary Park, Union Point Park, and the 66th Avenue Gateway. The Public Works Department would review the plans prior to construction to ensure pedestrian safety. *Recreational Facilities:* Parking would be incorporated into the Studio One and East Oakland Sports Complex. The Public Works Department would review the plans prior to construction to ensure pedestrian safety. *City-wide Creeks:* N.A.
Waterfront Policies		
Policy W1.2	**Planning with the Port of Oakland.** Plans for maritime and aviation operations as well as activities on all lands in Port jurisdiction should be coordinated with, and generally consistent with the Oakland General Plan.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The City of Oakland is coordinating with the Port of Oakland for waterfront access for Measure DD components located on Port property. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy W2.1	**Linking Neighborhoods with the Waterfront.** All recreational activity sites along the waterfront should be connected to each other to create continuous waterfront access. Safe and direct automobile, bicycle, pedestrian and waterway access between the waterfront and adjacent neighborhoods should be created and strengthened.	*Lake Merritt and Lake Merritt Channel:* N.A. Projects along Lake Merritt Channel would improve the link between neighborhoods and waterfront. *Waterfront Trail:* Measure DD would include filling in the access gaps along the Oakland Waterfront Trail, allowing bicycle and pedestrian access. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W2.3	**Providing Public Access Improvements.** Public access improvements to the waterfront and along the water's edge should be implemented as projects are developed. The access improvement should conform to the requirements of the Bay Conservation and Development Commission (BCDC).	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD would provide waterfront access along the Oakland Estuary and would conform to the requirements of BCDC. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W2.5	**Improved Railroad Crossings.** To create safe access to the water pedestrian, bicycle, and automobile railroad crossings should be provided where feasible. Crossings could include grade separations, at-grade crossings, skyway bridges, or connections between buildings.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD includes a waterfront crossing of the Railroad Bridge at High Street. The trail is proposed to be constructed under the bridge, thus removing potential railroad/pedestrian conflicts. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W2.9	**Parking at Key Points.** Parking should be developed at key points generally set back from the waterfront to minimize the impact of private automobile use in high-activity areas. Parking structures that incorporate ground floor uses, are available for day and night activities, and allow for shared use, are preferred.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Parking would be provided at Estuary Park, Union Point Park, and the 66th Avenue Gateway. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W2.10	**Making Public Improvements as a Part of Projects.** Physical improvements to improve the aesthetic qualities of the waterfront, and increase visitor comfort, safety, and enjoyment should be incorporated in the development of projects in the waterfront area. These amenities may include landscaping, lighting, public art, comfort stations, street furniture, picnic facilities, bicycle racks, signage, etc. These facilities should be accessible to all persons and designed to accommodate elderly and physically disabled persons.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Physical improvements that would be implemented as part of the Measure DD include the installation of: widened trails; lights; signs; landscaping; and benches. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W2.11	**Disseminating Public Information.** Waterfront development should incorporate public, educational and interpretive information for waterfront activities to encourage public knowledge and understanding of the historic, cultural, economic, and environmental context.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Educational signage would be incorporated into the Waterfront Trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy W3.1	**Requiring Consistency with Conservation Objectives and Policies.** Waterfront objectives, policies, and actions regarding geology, land stability, erosion, soils, water quality, flood hazards, wetland plant and animal habitats, and air quality and pollutants, shall be consistent and in compliance with the 1996 Open Space, Conservation, and Recreation Element of the City's General Plan.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The Measure DD components would be consistent with policies related to geology, land stability, erosion, soils, water quality, flood hazards, wetland plant and animal habitats, and air quality and pollutants. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W3.2	**Enhancing the Quality of the Natural and Built Environment.** The function, design and appearance, and supplementary characteristics of all uses, activities, and facilities should enhance, and should not detract from or damage the quality of, the overall natural and built environment along the waterfront.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Construction along the waterfront associated with Measure DD components would be relatively minimal and include trails and associated improvements. The construction of major structures is not included as part of the Measure DD components. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W3.3	**Protecting and Preserving Wetland Plant and Animal Habitats.** Native plant communities, wildlife habitats, and sensitive habitats should be protected and enhanced.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Potential biological impacts associated with the Measure DD components along the Waterfront Trail are discussed in Section IV.F, Biological Resources, of the Draft EIR. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W3.4	**Preserving Views and Vistas.** Buildings and facilities should respect scenic viewsheds and enhance opportunities for visual access of the waterfront and its activities.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Construction along the waterfront associated with Measure DD components would be relatively minimal and include trails and associated improvements. The construction of structures (other than minor structures associated with parks) are not included as part of the Measure DD components. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W9.3	**Defining Development Characteristics Along the Estuary.** Mixed use and residential developments should be sensitive to adjacent properties and designed to enhance the existing and unique characteristics of the waterfront and immediate surroundings. Individual properties should be designed to encourage and provide sufficient public access to the waterfront and designed to avoid the feeling of "gated" or private communities.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Construction along the waterfront associated with Measure DD components would be relatively minimal and include trails and associated improvements that allow for access to the waterfront. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy W10.6	**Specifying Public Access and Linkages.** Public access along the estuary should be facilitated by commercial and active recreational uses. It is important to have physical access to and between uses and activities along the waterfront, particularly along the shoreline. Opportunities for landscaped and signed linkages along Broadway, Webster, Harrison, and Oak streets, as well as the Lake Merritt Channel, should be developed for (land and water) auto, bicycle, pedestrian, and public transportation.	*Lake Merritt and Lake Merritt Channel:* N.A. Projects along Lake Merritt Channel would improve the link between neighborhoods and waterfront. *Waterfront Trail:* Implementation of the Measure DD Waterfront Trail components would complete the Bay Trail along the Oakland Estuary. These components of Measure DD would include installation of signage and landscaping. Measure DD currently does not include linkages to the Waterfront Trail along Broadway, Webster, Harrison, and Oak Streets. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W11.5	**Specifying Public Access and Linkages.** Public access and linkages should be provided from the San Antonio neighborhoods to the Embarcadero Cove. Signage, landscaping, and gateways should be provided, where necessary, to access points and pathways.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of the Measure DD Waterfront Trail components would complete the Bay Trail along the Oakland Estuary. Measure DD currently does not include linkages from the San Antonio neighborhoods to Embarcadero Cove. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W12.2	**Defining Fruitvale Waterfront Land Uses.** This area should allow for the current use of existing industry and manufacturing uses as well as residential use; however, the area should be promoted for uses that better utilize the waterfront's unique position in the City. Depending on the level of intensity, uses that can benefit from close proximity to the airport and business park may be appropriate. Commercial businesses, recreation, and housing should be able to coexist in this area with appropriate buffering measures.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would provide continuous waterfront access along the Oakland Estuary. The construction of structures, other than minor structures associated with parks, is not proposed as part of Measure DD. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W12.4	**Defining Mixed Use Characteristics.** The mixed use characteristics for the area should incorporate office, commercial, and industrial uses, with recreation facilities and housing where appropriate and feasible.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The construction of office, commercial, or residential structures is not proposed as part of Measure DD. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W12.6	**Specifying Public Access and Linkages.** With a residential community, the Kennedy Tract neighborhood, adjacent to the waterfront, efforts should be made to create inviting, landscape, and signed connections and gateways to the waterfront. Support efforts in developing access to the Fruitvale Bridge fishing pier and additional open space.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Providing access to the Fruitvale Bridge fishing pier is not proposed as part of Measure DD. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy W12.7	**Defining Design Criteria.** Development in this area should be designed to enhance direct access to and along the water's edge, maximize waterfront views and vistas, and make public pedestrian access and spaces inviting. Development and amenities must be sensitive to immediate surroundings.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would provide continuous waterfront access along the Oakland Estuary. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Neighborhood Policies		
Policy N9.5	**Marking Significant Sites.** Identify locations of interest and historic significance by markers, signs, public art, landscape, installations, or by other means. (See the Historic Preservation Element for treatment of historic resources.)	*Lake Merritt and Lake Merritt Channel:* Places of historic significance around Lake Merritt and Lake Merritt Channel would be marked as appropriate. *Waterfront Trail:* Places of historic significance along the Waterfront Trail would be marked as appropriate. *Recreational Facilities:* N.A.*; City-wide Creeks:* N.A.
Policy N9.8	**Preserving History and Community.** Locations that create a sense of history and community within the City should be identified and preserved where feasible. (See the Historic Preservation Element for more information).	*Lake Merritt and Lake Merritt Channel:* Identified historic assets around Lake Merritt, including the Pergola, Cleveland Cascade, and Municipal Boathouse, would be preserved. *Waterfront Trail:* The Waterfront Trail would include a series of historic markers which described important events/time periods that occurred along the waterfront. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Estuary Policy Plan		
Land Use Objectives		
Objective LU-1	Provide for a broad mixture of activities within the Estuary area.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would result in the construction of a continuous Waterfront Trail along the estuary, as well as Estuary Park and Union Point Park. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective LU-2	Provide for public activities that are oriented to the water.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would result in the construction of a continuous public Waterfront Trail along the estuary, as well as Estuary Park and Union Point Park. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Shoreline Access & Public Spaces Objectives		
Objective SA-1	Create a clear and continuous system of public access along the Estuary shoreline.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would result in the construction of a continuous public waterfront trail along the estuary. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective SA-2	Punctuate the shoreline promenade with a series of parks and larger open spaces.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would result in the construction of a continuous Waterfront Trail along the estuary and two waterfront parks: Estuary Park and Union Point Park. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Objective SA-3	Emphasize visual corridors and open space links to surrounding inland areas.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The continuous Waterfront Trail would allow for increased access to visual corridors along the waterfront. Measure DD does not include open space links to surrounding inland areas. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective SA-4	Develop opportunities for recreational activities that are oriented to the waterfront and serve identified neighborhood needs.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The proposed project includes construction/renovation of two waterfront parks (Estuary Park and Union Point Park) allowing for recreational activities. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective SA-5	Enhance natural areas along the shoreline.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Vegetation restoration and maintenance along the waterfront is proposed as part of Measure DD. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective SA-6	Encourage the development of educational and cultural programs and interpretive facilities that enhance understanding of the waterfront environment.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Informational signage would be incorporated into the Waterfront Trail. *Recreational Facilities:* N.A. *City-wide Creeks:*N.A.
Regional Circulation & Local Network Objectives		
Objective C-1	Improve and clarify regional access to Oakland's waterfront.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Installation of the Waterfront Trail would improve access to the Oakland Estuary and waterfront. *Recreational Facilities:* N.A.*; City-wide Creeks:* N.A.
Objective C-2	Establish a continuous waterfront parkway; a safe promenade for pedestrians, bicycles, and slow-moving automobiles.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would result in a continuous Waterfront Trail for pedestrians and bicyclists. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective C-6	Improve pedestrian and bicycle circulation.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of Measure DD would improve bicycle pedestrian and bicycle circulation along the waterfront. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Oak-to-Ninth Avenue District Policies		
Policy Oak-1	Protect and enhance the natural and built components that establish the waterfront's unique environment.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The Cash and Carry Warehouse at Estuary Park may be incorporated into the park or may be demolished. Other buildings and other built components along the waterfront would not be substantially modified. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-1.1	Encourage the preservation and enhancement of wetland areas.	*Lake Merritt and Lake Merritt Channel:* Wetlands would be enhanced in Lake Merritt Channel. *Waterfront Trail:* Preservation and enhancement of wetland areas are not proposed as part of the waterfront improvements under Measure DD. *Recreational Facilities:* N.A.; *City-wide Creeks:* Creek improvements may include wetlands.
Policy Oak-1.2	Provide for continuous pedestrian and bicycle movement along the water's edge.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Components would create a continuous pedestrian and bicycle trail along the waterfront by linking existing segments of the Bay Trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-1.3	Undertake remediation of contaminants in conjunction with development and/or improvement of relevant sites.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Remediation activities would occur at a variety of sites along the waterfront trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Estuary Park & Mouth of Lake Merritt Channel Policies		
Policy Oak-2	Establish a well-structured, integrated system of major recreational facilities which accommodate a wide variety of activities and which take advantage of the unique waterfront setting. Promote a variety of recreational experiences.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Components support the integration of recreational systems through a trail linkage and would promote a variety of recreational opportunities. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-2.1	Expand Estuary Park. Encourage aquatic sports within the mouth of Lake Merritt Channel.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Estuary Park has been renovated and may expand into the Cash and Carry Warehouse area north of the park. Improvements have included pier/dock improvements to facilitate access to the water. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-2.2	Create a major new park on the east side of the mouth of Lake Merritt Channel, at the Estuary.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD does not include a new park on the east side of Lake Merritt Channel. *Recreational Facilities:* N.A. ; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy Oak-2.4	Establish a large park in the area of the existing Ninth Avenue Terminal to establish a location for large civic events and cultural activities.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Construction of a park at the Oak to 9th Street site is not included as part of the Measure DD Project. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Lake Merritt Channel Policies		
Policy Oak-3	Link the Estuary to Lake Merritt by enhancing the Lake Merritt Channel.	*Lake Merritt and Lake Merritt Channel:* Replacement of the 10th and 12th Street culverts with bridges, a widened Channel, and improved pedestrian and bike trail connections would link Lake Merritt and the Estuary. *Waterfront Trail:* N.A.; *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-3.1	Create a system of public open spaces that connects Lake Merritt Channel to the Estuary.	*Lake Merritt and Lake Merritt Channel:* Public open spaces connecting Lake Merritt Channel to the Estuary include Peralta Park and Channel Park. Improvements at 12th Street, 10th Street, and 7th Street would improve wildlife and recreational connections to the Estuary. *Waterfront Trail:* N.A.; *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Fifth Avenue Point Policies		
Policy Oak-4.2	Promote development of educational and cultural interpretive facilities.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Informational signage would be incorporated into the Waterfront Trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy Oak-4.4	Promote the development of commercial-recreational uses in the vicinity of the Crescent Park and Clinton Basin.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD Project does not include development at Crescent Park or the Clinton Basin. *Recreational Facilities: N.A.; City-wide Creeks:* N.A.
Local Street Improvements Policies		
Policy Oak-10	Create a network of pedestrian-friendly streets that opens up views and access to the water.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Waterfront Trail improvements would create a continuous trail along for Oakland Estuary for pedestrian and bicycle use, allowing for views and access of the water. *Recreational Facilities:* N.A; *City-wide Creeks:* N.A.
Open Space, Conservation and Recreation Element		
Policy OS-2.1	**Protection of Park Open Space.** Manage Oakland's urban parks to protect and enhance their open space character while accommodating a wide range of outdoor recreational activities.	*Lake Merritt and Lake Merritt Channel:* Changes to Lake Merritt and Lake Merritt Channel, proposed under Measure DD, would increase the open space at Lake Merritt and provide improved pedestrian and bicycle access to the Lake. *Waterfront Trail:* The Waterfront Trail improvements would include construction/restoration of two waterfront parks and the installation of a Waterfront Trail allowing for continuous access to the waterfront. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy OS-2.5	**Urban Park Acquisition Criteria.** Increase the amount of urban parkland in the seven flatland planning areas, placing a priority on land with the following characteristics (not in priority order): (a) Land in areas with limited public open space, as identified in the Recreation Chapter of OSCAR; (b) Land adjacent to existing parks which has the potential to accommodate park expansion or to link together existing parks; (c) Land with the potential to provide creek or shoreline access; (d) Land with visual or historic significance; (e) Land that can be acquired at no cost or at a reduced cost, or land where matching funds for acquisition are available; (f) Land in areas with dense concentrations of people, especially children; and land in areas with large concentrations of workers or pedestrians; (g) Land that is highly visible from major streets or that is adjacent to existing public buildings, particularly police and fire stations.	*Lake Merritt and Lake Merritt Channel:* Changes to Lake Merritt and Lake Merritt Channel, proposed under Measure DD, would increase the open space at Lake Merritt and provide improved pedestrian and bicycle access to the Lake. *Waterfront Trail:* Land acquired for conservation and remediation has potential to provide shoreline access and would serve to link existing parks together. *Recreational Facilities:* The East Oakland Sports Complex would expand Ira Jenkins Park. *City-wide Creeks:* Creek property acquisitions would provide creek access and restoration.
Policy OS-2.6	**Street Closures for Parks, Plazas, and Gardens.** Where there is broad community and local support and where legally permissible, allow local street closures as a way of creating new parks, plazas, and garden sites in urban neighborhoods.	*Lake Merritt and Lake Merritt Channel:* Street closures and realignments that would create new parkland and plazas, including the cul-de-sac of Lakeshore Avenue, the realignment of 20th-Harrison intersection, and the realignment of 12th street. *Waterfront Trail:* Both terminus of Derby Street and Lancaster Avenue would be closed and converted into plazas. These plazas would be adjacent to the waterfront trail. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy OS-5.1	**Priorities for Trail Improvement.** Improve trail connections within Oakland, emphasizing connections between the flatlands and the hill and shoreline parks; lateral trail connections between the hill area parks; and trails along the waterfront (see Figure 6 of OSCAR).	*Lake Merritt and Lake Merritt Channel:* Components would improve trail connections around Lake Merritt and the along the Channel. *Waterfront Trail:* Components would improve the Bay Trail along the waterfront. *Sports Complex:* N.A. *City-wide Creeks:* Components would improve trail connections at certain parks.
Policy OS-5.2	**Joint Use of Rights-of-Way.** Promote the development of linear parks or trails within utility or transportation corridors, including transmission line rights-of-way, abandoned railroad rights-of-way, and areas under the elevated BART tracks.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD proposed to extend the trail connection under three existing vehicle bridges and one railroad bridge. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy OS-5.3	**Trail Design Principles.** Plan and design all new trails in a manner which: (a) minimizes environmental impacts; (b) fully considers neighbor privacy and security issues; (c) involves the local community in alignment and design; and (d) considers the needs of multiple users, including pedestrians, bicycles, and wheelchairs.	*Lake Merritt and Lake Merritt Channel:* The new trails around Lake Merritt and the Channel are constrained by existing development, but generally achieve these principles. *Waterfront Trail:* Ongoing-trail planning and design efforts for the waterfront have incorporated these design principles. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy OS-5.4	**Maintenance of Mid-Block Paths.** Maintain a network of mid-block paths and stairsteps in Oakland to enhance neighborhood character and provide pedestrian "short-cuts" through developed areas.	*Lake Merritt and Lake Merritt Channel:* The renovation of Cleveland Cascade, a mid-block staircase off of Lakeshore Avenue, is included in Measure DD. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A; *City-wide Creeks:* N.A.
Policy OS-6.1	**Intergovernmental Coordination.** Coordinate Oakland's open space planning with other agencies, including adjacent cities and counties, the Port of Oakland, and the East Bay Regional Park District.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The City of Oakland would coordinate with other agencies as appropriate. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Objective OS-7	**To increase physical and visual access to the Oakland shoreline and create new opportunities for shoreline recreation.**	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Implementation of the Waterfront Trail components will increase physical and visual access to the Oakland Estuary. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy OS-7.1	**Promotion of Beneficial Waterfront Uses.** Require land uses along the shoreline which promote the beneficial uses of the Estuary and Bay waters, including a balanced mix of commercial shipping facilities; water-dependent industry, commerce, and transportation; recreation; water-oriented services and housing; and resource conservation.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Only recreational uses are proposed along the waterfront as part of Measure DD. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy OS-7.2	**Dedication of Shoreline Public Access.** Support the BCDC requirements which mandate that all new shoreline development designate the water's edge as publicly accessible open space where safety and security are not compromised, and where access can be achieved without interfering with waterfront industrial and maritime uses. Where such conflicts or hazards would result, support the provision of off-site access improvements in lieu of on-site improvements. In such cases, the extent of off-site improvements should be related to the scale of the development being proposed.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* The Waterfront Trail improvements would result in a continuous waterfront trail providing public access to the Oakland Estuary and would meet BCDC requirements. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy OS-7.3	**Waterfront Appreciation.** Promote a greater appreciation of the Oakland waterfront by preserving and enhancing waterfront views, promoting its educational value, and, exploring new and creative ways to provide public access to the shoreline without interfering with transportation and shipping operations or endangering public safety.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Completion of the Waterfront Trail would allow for public access along the Oakland Estuary. Information signage would be installed at appropriate locations along the trail. To avoid potential pedestrian/vehicle conflicts, continuation of the trial under four existing bridges is proposed. Additionally, a steel canopy is proposed along a portion of the waterfront trail to avoid potential conflicts with existing industrial uses. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy OS-7.4	**Waterfront Park Enhancement.** Expand and enhance the City's waterfront park areas. Signage and access provisions to existing waterfront parks should be improved. Opportunities for new shoreline parks as depicted in Figure 7 of OSCAR (Shoreline Access) should be pursued as redevelopment along the waterfront occurs. A variety of park environments should be created, including active recreation areas, fishing piers and boating facilities, natural areas, and small "pocket" parks with landscaping and benches, all linked by linear parks or pedestrian paths emphasizing shoreline views and access.	*Lake Merritt and Lake Merritt Channel:* Waterfront park areas and access along the Channel would be improved *Waterfront Trail:* Components would improve signage and access along the waterfront. A variety of parks and recreation opportunities would be created. *Recreational Facilities:* N.A. *City-wide Creeks:* Components would improve access to creeks and educational and recreational opportunities.
Policy OS-7.5	**Lateral Access and Links to the Flatlands.** Improve lateral access along the Oakland shoreline and linkages between the shoreline and nearby neighborhoods by creating a “Bay Trail” along the length of the Oakland waterfront. Where an alignment immediately along the waterfront is not possible, site the trail as close to the water as possible, with spur trails leading to the water’s edge. In the transitional areas between Jack London Square and High Street, interim alignments may be designated along local streets but the ultimate goal should be an unbroken trail along the water’s edge between Jack London Square and Martin Luther King, Jr. Regional Shoreline.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Linkages of the shoreline to existing neighborhoods is not proposed under Measure DD. Implementation of this group of Measure DD components would result in a continuous public walkway along the Oakland Waterfront. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Objective OS-8	**Creek Conservation.** To conserve open space along Oakland's creeks, restoring the creeks where feasible and enhancing creek access on public lands.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* Creek restoration activities would occur at a variety of locations throughout the City.

Policy #	Policy	Relationship
Policy OS-8.2	**Creek Daylighting.** Support programs to restore or "daylight" sections of creek that have been culverted or buried in the storm drain system, provided that the following conditions exist: (1) broad-based community support for the project; (2) availability of financial resources for the project; and (3) no significant health, safety, flooding, or erosion hazards would result from the project. Place priority for daylighting on properties where additional opportunities for recreational access would be created.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* Creek daylighting is not proposed as part of Measure DD.
Policy OS-9.3	**Gateway Improvements.** Enhance neighborhood and city identity by maintaining or creating gateways. Maintain view corridors and enhance the sense of arrival at the major entrances to the city, including freeways, BART lines, and the airport entry. Use public art, landscaping, and signage to create stronger City and neighborhood gateways.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Improvements will be made to the 66th Avenue Gateway. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy OS-12.1	**Street Tree Selection.** Incorporate a broad and varied range of tree species which is reflected on a city-maintained list of approved trees. Street tree selection should respond to the general environmental conditions at the planting site, including climate and micro-climate, soil types, topography, existing tree planting, maintenance of adequate distance between street trees and other features, the character of existing development, and the size and context of the tree planting area.	*Lake Merritt and Lake Merritt Channel:* Street tree selection would reflect the city-maintained list of approved trees. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy OS-12.2	**Street Tree Maintenance.** Maintain street trees to promote their natural form, eliminate hazardous conditions, provide adequate vertical clearance over streets and sidewalks, and abate pest and disease problems.	*Lake Merritt and Lake Merritt Channel:* Trees that are dead, dying, diseased, or create a hazardous condition would be removed. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy OS-12.3	**Street Tree Removal.** Remove street trees only if they are hazardous, severely and incurably infested with insects or blight, or are severely and irreversibly damaged and deformed. Provide replacement trees in all cases where the site is suitable for street trees.	*Lake Merritt and Lake Merritt Channel:* Trees that are dead, dying, diseased, or create a hazardous condition would be removed. Replacement trees would be planted where appropriate. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Policy #	Policy	Relationship
Policy CO-4.2	**Drought-Tolerant Landscaping.** Require use of drought-tolerant plants to the greatest extent possible and encourage the use of irrigation systems which minimize water consumption.	*Lake Merritt and Lake Merritt Channel:* Drought-tolerant landscaping would be used to the greatest extent possible. *Waterfront Trail:* Drought-tolerant landscaping would be used to the greatest extent possible. *Recreational Facilities:* Drought-tolerant landscaping would be used to the greatest extent possible. *City-wide Creeks:* Drought-tolerant landscaping would be used to the greatest extent possible.
Policy CO-6.1	**Creek Management.** Protect Oakland's remaining natural creek segments by retaining creek vegetation, maintaining creek setbacks, and controlling bank erosion. Design future flood control projects to preserve the natural character of creeks and incorporate provisions for public access, including trails, where feasible. Strongly discourage projects which bury creeks or divert them into concrete channels.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* Creek restoration activities would help protect existing creeks.
Policy CO-6.2	**Creek Maintenance and Safety.** Strictly enforce local, state and federal laws and ordinances on the maintenance of creeks and watercourses. Abate health and safety hazards along and within creeks through a variety of measures, including creek clean-up programs, stronger enforcement of litter and anti-dumping laws, and vegetation maintenance requirements for properties abutting creeks.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* The City would enforce all local, state and federal laws regarding creek maintenance and safety. Creek restoration activities proposed under Measure DD would improve creek water quality within the city.
Policy CO-6.4	**Lake Management.** Manage Oakland's lakes to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. Discourage new recreational uses which impair the ability of the lakes to support fish and wildlife. Support improvements which enhance water circulation, water quality, and habitat value, provided they are cost-effective and are compatible with established recreational activities.	*Lake Merritt and Lake Merritt Channel:* Measure DD will include projects to improve water quality and ecological functions of Lake Merritt. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Objective CO-7	**Protection of Native Plant Communities.** To minimize the loss of native plant communities and restore these communities where they have been damaged or lost, and to preserve Oakland's trees unless there are compelling safety, ecological, public safety, or aesthetic reasons for their removal.	*Lake Merritt and Lake Merritt Channel:* Trees that are dead, dying, diseased, or create a hazardous condition would be removed. Replacement trees would be planted where appropriate. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* Creek restoration activities would include the installation of native vegetation.

Policy #	Policy	Relationship
Policy CO-7.1	**Protection of Native Plant Communities** Protect native plant communities, especially oak woodlands, redwood forests, native perennial grassland, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* Creek restoration activities would preserve or restore native vegetation.
Policy CO-7.5	**Non-Native Plant Removal.** Do not remove non-native plants within park and open space areas solely because they are non-natives. Plant removal should be related to other valid management policies, including fire prevention.	*Lake Merritt and Lake Merritt Channel:* Trees that are dead, dying, diseased, or create a hazardous condition would be removed. Replacement trees would be planted where appropriate. *Waterfront Trail:* Non-native vegetation would be removed from select locations along the Waterfront Trail. *Recreational Facilities:* N.A. *City-wide Creeks:* Non-native vegetation may be removed to replace with native vegetation.
Policy CO-7.6	**Rehabilitation Of Damaged Or Dead Vegetation.** Encourage programs which rehabilitate, enhance, or replace damaged or dead vegetation as appropriate.	*Lake Merritt and Lake Merritt Channel:* Trees that are dead, dying, diseased, or create a hazardous condition would be removed. Replacement trees would be planted where appropriate. *Waterfront Trail:* Damaged or dead vegetation may be removed as part of the waterfront improvements. *Recreational Facilities:* N.A. *City-wide Creeks:* Removal of damaged or dead vegetation may occur as part of the restoration activities.
Objective CO-8	**Wetlands.** To conserve wetlands so that they may continue to provide habitat for fish and wildlife.	*Lake Merritt and Lake Merritt Channel:* Lake Merritt Channel would be widened and would continue to provide habitat for fish and other wildlife. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Objective CO-9	**Rare, Endangered, and Threatened Species.** To protect rare, endangered, and threatened species from the impacts of urbanization.	*Lake Merritt and Lake Merritt Channel:* Section IV.F, Biological Resources, includes mitigation measures to protect rare, endangered and threatened species. *Waterfront Trail:* Section IV.F, Biological Resources, includes mitigation measures to protect rare, endangered and threatened species. *Recreational Facilities:* N.A. *City-wide Creeks:* Section IV.F, Biological Resources, includes mitigation measures to protect rare, endangered and threatened species.

Policy #	Policy	Relationship
Policy Rec-1.2	**No Net Loss of Open Space.** Unless overriding considerations exist, allow no net loss of open space within Oakland's urban park system. In other words, the area covered by park buildings or other recreational facilities in the future should be offset in the long-run by acquisition or improvement of an equivalent or larger area of open space. Replacement open space should be of comparable value to the space lost and should generally serve an area identified on Figure 18 (Park Deficient Areas) as having un-met needs.	*Lake Merritt and Lake Merritt Channel:* Changes to Lake Merritt and Lake Merritt Channel, proposed under Measure DD, would increase the open space at Lake Merritt and provide improved pedestrian and bicycle access to the Lake. *Waterfront Trail:* Implementation of the waterfront trail components would result in the construction/renovation of two parks. *Recreational Facilities:* Construction of the East Oakland Sports Complex would result in the development of park land. However, new recreational opportunities would be created. *City-wide Creeks:* Restoration/acquisition activities would not result in the conversion of open space.
Policy Rec-1.4	**Park Improvement Or Change In Use.** Require any improvement or change in use within a City of Oakland park to be subject to a formal review and approval process. Provide potential park users and local residents with opportunities to participate in this process.	*Lake Merritt and Lake Merritt Channel:* All Measure DD improvements have been approved by the City Council. *Waterfront Trail:* All Measure DD improvements have been approved by the City Council. *Recreational Facilities:* All Measure DD improvements have been approved by the City Council. *City-wide Creeks:* All Measure DD improvements have been approved by the City Council.
Policy Rec-2.2	**Conflicts Between Park Uses.** Site park activities and facilities in a manner which minimizes conflict between park uses. Wherever feasible, use National Recreation and Park Association (NRPA) standards to determine the area and dimensional requirements for new facilities. In new parks, arrange activities and land uses to accommodate all of the intended uses, in optimal relationship to one another and making the efficient use of the space possible.	*Lake Merritt and Lake Merritt Channel:* Project components would improve and enhance existing park activities and facilities. Certain components would create a new use or relocate existing uses but would not create a conflict between park uses. *Waterfront Trail:* Project components along the Waterfront Trail and associated parks would minimize conflicts between park uses. Section IV.A, Land Use, describes one potential land use conflict and identifies a mitigation measure that would reduce the conflict to a less-than-significant level. *Recreational Facilities:* N.A. *City-wide Creeks:* The limited uses associated with the creek restoration components would not create use conflicts.

Policy #	Policy	Relationship
Policy Rec-2.4	**Off-Site Conflicts.** Manage park facilities and activities in a manner which minimizes negative impacts on adjacent residential, commercial, or industrial areas.	*Lake Merritt and Lake Merritt Channel:* Project components would improve and enhance existing park activities and facilities. Certain project components would create a new use or relocate existing uses, but would not create significant negative impacts on adjacent uses. *Waterfront Trail:* Project components along the waterfront trail and associated parks would minimize conflicts between park uses. Section IV.A, Land Use, describes one potential land use conflict and identifies a mitigation measure that would reduce the conflict to a less-than-significant level. *Recreational Facilities:* Both recreational facilities sites are located in urban areas with a variety of surrounding land uses; significant negative impacts on adjacent uses are not expected. *City-wide Creeks:* The limited uses associated with the creek restoration project components would not create use conflicts.
Policy Rec-2.6	**Historic Park Features.** Respect historic park features when designing park improvements or programming new park activities.	*Lake Merritt and Lake Merritt Channel:* Changes to historic structures located around Lake Merritt would be done in accordance to the historic structure standards used by the City of Oakland. *Waterfront Trail:* There are no historic park features associated with the Waterfront Trail. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy Rec-3.3	**Park Location Factors.** Consider a range of factors when locating new parks or recreational facilities, including local recreational needs, projected operating and maintenance costs, budgetary constraints, surrounding land uses, citizen wishes, accessibility, the need to protect or enhance a historic resource, and site visibility.	*Lake Merritt and Lake Merritt Channel:* Such park location factors were considered in the siting of the new park at the south of Lake Merritt. *Waterfront Trail:* The planning process for the Waterfront Trail has considered many such factors. *Recreational Facilities:* Construction of the Recreational Facilities would help to meet local demand. *City-wide Creeks:*N.A.
Historic Preservation Element		

Policy #	Policy	Relationship
Policy 3.1	Avoid or minimize adverse historic preservation impacts related to discretionary City actions.	*Lake Merritt and Lake Merritt Channel:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Waterfront Trail:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Recreational Facilities:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *City-wide Creeks:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts.
Policy 3.2	**Historic Preservation and City-owned properties** To the extent consistent with other Oakland General Plan objectives, the City will ensure that all City-owned or controlled properties warranting preservation will, in fact, be preserved. All City-owned or controlled properties which may be eligible for Landmark or Heritage Property designation or as contributors or potential contributors to a Preservation District will be considered for such designation. Properties held by the City for purposes of subsequent disposition will be exempt from this policy but shall be subject to Policy 3.3	*Lake Merritt and Lake Merritt Channel:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Waterfront Trail:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Recreational Facilities:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *City-wide Creeks:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts.
Policy 4.1	**Archeological Resources** To protect significant archeological resources, the City will take special measures for discretionary projects involving ground disturbances located in archeologically sensitive areas.	*Lake Merritt and Lake Merritt Channel:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Waterfront Trail:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *Recreational Facilities:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts. *City-wide Creeks:* Implementation of the City's standard conditions of approval, in addition to the mitigation measures outlined in Section IV.G, would reduce potential historic preservation impacts.
Bicycle Master Plan		

Policy #	Policy	Relationship
Policy 4	Include provisions for safe and direct bicycle access to special development areas and key corridors.	*Lake Merritt and Lake Merritt Channel:* Implementation of the Lake Merritt and Channel components of Measure DD would provide safe and direct bicycle access. *Waterfront Trail:* Implementation of the Waterfront Trail components of Measure DD would provide safe and direct bicycle access to the Oakland Estuary. *Recreational Facilities:* N.A.*; City-wide Creeks:* N.A.
Action 4.4	*The Waterfront.* Seize opportunities to improve bicycle access to the Oakland waterfront through completion and implementation of 1) the Estuary Policy Plan; 2) the Bay Trail alignment; and 3) the joint City, Port, and BCDC's Public Access Plan.	*Lake Merritt and Lake Merritt Channel:* N.A. *Waterfront Trail:* Measure DD includes completion of the Waterfront Trail along the estuary. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Action 4.5	*Lake Merritt.* Develop a network of bikeways around and leading to Lake Merritt incorporating landscape treatments to enhance the aesthetic and natural qualities of the lake. Design the bikeways closest to the shore of the lake as multi-use paths for walking, wheel-chair access, running, and in-line skating. Design the bikeways further from the lake to provide more direct and higher speed routes for bicycling. Provide a safe, direct and convenient route across the 12th/14th Street couplet at the west end of the lake.	*Lake Merritt and Lake Merritt Channel:* Bike lines around Lake Merritt would be installed. A multi-purpose path around the Lake would be installed. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Action 4.6	*Channel Pathway.* Upgrade the existing path along the Lake Merritt Channel from Lake Merritt to the Bay Trail. Design the path to accommodate a variety of users as noted in the action above.	*Lake Merritt and Lake Merritt Channel:* The Channel pathway would be upgraded. *Waterfront Trail:* N.A. *Recreational Facilities:* N.A. *City-wide Creeks:* N.A.
Policy 8	Ensure that the needs of bicyclists are considered in the design of new development and redevelopment projects.	*Lake Merritt and Lake Merritt Channel:* Bicycle access would be incorporated in the Lake Merritt and Lake Merritt Channel improvements. *Waterfront Trail:* Implementation of the Waterfront Trail component of Measure DD would allow for pedestrian and bicycle access to the estuary. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Policy 10	Prior to the implementation of bikeway projects, affected residents, merchants and property owners shall be notified in writing of the potential impacts.	*Lake Merritt and Lake Merritt Channel:* Affected residents, merchants and property owners would be notified in writing of the potential impacts. *Waterfront Trail:* Affected residents, merchants and property owners would be notified in writing of the potential impacts. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
Pedestrian Master Plan		

Policy #	Policy	Relationship
PMP Policy 3.1	*Streetscaping.* Encourage the inclusion of street furniture, landscaping, and art in pedestrian improvement	*Lake Merritt and Lake Merritt Channel:* The Lake Merritt and Channel project components would include street furniture and landscaping. *Waterfront Trail:* The Waterfront Trail would include street furniture, landscaping, and informational signage. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.
PMP Policy 3.2	*Land Use.* Promote land uses and site designs that make walking convenient and enjoyable.	*Lake Merritt and Lake Merritt Channel:* The Lake Merritt and Channel project components would include walking trails and paths. *Waterfront Trail:* The Waterfront Trail would provide convenient and enjoyable walking experiences. *Recreational Facilities:* N.A.; *City-wide Creeks:* N.A.

Source: City of Oakland Land Use and Transportation Element, March 1998. Estuary Policy Plan, June 1999. City of Oakland Open Space, Conservation and Recreation Element, June 1996; City of Oakland Bicycle Master Plan 1999; City of Oakland Pedestrian Master Plan 2002.

PUBLIC REVIEW DRAFT

CITY OF OAKLAND MEASURE DD IMPLEMENTATION PROJECT ENVIRONMENTAL IMPACT REPORT

APPENDIX E: TRAFFIC

STATE CLEARINGHOUSE #2006122048

LSA

July 2007

PUBLIC REVIEW DRAFT

CITY OF OAKLAND MEASURE DD IMPLEMENTATION PROJECT ENVIRONMENTAL IMPACT REPORT

APPENDIX E: TRAFFIC

STATE CLEARINGHOUSE #2006122048

Submitted to:

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July 2007

APPENDIX E

TRAFFIC DATA

Existing Conditions

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	10	536	213	894	143	410	359	120	53	541	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.98			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	0.99			1.00	1.00
Satd. Flow (prot)		1438	1279	1596	3539	1319	1610	2997			3514	1291
Flt Permitted		0.51	1.00	0.60	1.00	1.00	0.95	0.54			0.82	1.00
Satd. Flow (perm)		746	1279	1003	3539	1319	1610	1641			2881	1291
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.95	0.95	0.95	0.78	0.78	0.78
Adj. Flow (vph)	65	11	602	227	951	152	432	378	126	68	694	444
RTOR Reduction (vph)	0	51	180	0	0	41	0	20	0	0	0	34
Lane Group Flow (vph)	0	139	308	227	951	111	311	605	0	0	762	410
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		341	585	459	1619	604	190	911			870	390
v/s Ratio Prot					c0.27		c0.19	0.08				
v/s Ratio Perm		0.19	0.24	0.23		0.08		0.23			0.26	c0.32
v/c Ratio		0.41	0.53	0.49	0.59	0.18	1.64	0.66			0.88	1.05
Uniform Delay, d1		19.2	20.6	20.2	21.3	17.0	46.8	22.4			35.1	37.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.74	1.70			1.00	1.00
Incremental Delay, d2		3.6	3.4	3.8	1.6	0.7	304.4	3.0			12.0	59.5
Delay (s)		22.8	23.9	23.9	22.9	17.7	339.0	41.1			47.1	96.5
Level of Service		C	C	C	C	B	F	D			D	F
Approach Delay (s)		23.6			22.5			140.1			65.3	
Approach LOS		C			C			F			E	

Intersection Summary				
HCM Average Control Delay	61.6	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	102.2%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	232	372	404	0	0	0	0	584	139	316	824	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.96						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.98						1.00	1.00	1.00	1.00	
Frt		0.94						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4285						3539	1329	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4285						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.91	0.91	0.91	0.88	0.88	0.88
Adj. Flow (vph)	239	384	416	0	0	0	0	642	153	359	936	0
RTOR Reduction (vph)	0	82	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	957	0	0	0	0	0	642	153	359	936	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1475						968	1329	459	1894	
v/s Ratio Prot								c0.18		c0.20		
v/s Ratio Perm		0.22							0.12		0.28	
v/c Ratio		0.65						0.66	0.12	0.78	0.49	
Uniform Delay, d1		29.3						34.2	0.0	36.5	13.6	
Progression Factor		1.00						1.00	1.00	1.03	0.56	
Incremental Delay, d2		2.2						3.6	0.2	8.8	0.6	
Delay (s)		31.6						37.7	0.2	46.4	8.2	
Level of Service		C						D	A	D	A	
Approach Delay (s)		31.6			0.0			30.5			18.8	
Approach LOS		C			A			C			B	

Intersection Summary				
HCM Average Control Delay	26.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av

Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	295	336	420	0	0	1146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frpb, ped/bikes	0.98	0.97	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	0.95	0.85	1.00			1.00
Flt Protected	0.97	1.00	1.00			1.00
Satd. Flow (prot)	3270	1394	3318			3318
Flt Permitted	0.97	1.00	1.00			1.00
Satd. Flow (perm)	3270	1394	3318			3318
Peak-hour factor, PHF	0.71	0.71	0.91	0.91	0.90	0.90
Adj. Flow (vph)	415	473	462	0	0	1273
RTOR Reduction (vph)	82	205	0	0	0	0
Lane Group Flow (vph)	527	74	462	0	0	1273
Confl. Peds. (#/hr)	70	7				
Confl. Bikes (#/hr)		16				
Parking (#/hr)			5			5
Turn Type		Perm				
Protected Phases	4		6			6
Permitted Phases		4				
Actuated Green, G (s)	21.1	21.1	49.9			49.9
Effective Green, g (s)	21.1	21.1	49.9			49.9
Actuated g/C Ratio	0.26	0.26	0.62			0.62
Clearance Time (s)	4.0	4.0	5.0			5.0
Vehicle Extension (s)	2.0	2.0	2.0			2.0
Lane Grp Cap (vph)	862	368	2070			2070
v/s Ratio Prot	c0.16		0.14			c0.38
v/s Ratio Perm		0.05				
v/c Ratio	0.61	0.20	0.22			0.61
Uniform Delay, d1	25.8	22.9	6.6			9.2
Progression Factor	1.00	1.00	0.25			1.00
Incremental Delay, d2	0.9	0.1	0.2			1.4
Delay (s)	26.8	23.0	1.9			10.6
Level of Service	C	C	A			B
Approach Delay (s)	25.6		1.9			10.6
Approach LOS	C		A			B

Intersection Summary				
HCM Average Control Delay	14.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: El Embarcadero EB & Grand Av

Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	420	277	197	1244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0		4.0	4.0
Lane Util. Factor			0.95		1.00	0.95
Frpb, ped/bikes			0.98		1.00	1.00
Flpb, ped/bikes			1.00		0.99	1.00
Frt			0.94		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3246		1760	3362
Flt Permitted			1.00		0.36	1.00
Satd. Flow (perm)			3246		669	3362
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.90	0.90
Adj. Flow (vph)	0	0	462	304	219	1382
RTOR Reduction (vph)	0	0	117	0	0	0
Lane Group Flow (vph)	0	0	649	0	219	1382
Confl. Peds. (#/hr)	70			29	29	
Confl. Bikes (#/hr)				5		
Parking (#/hr)				5	0	
Turn Type					custom	
Protected Phases			2		1	1 6 7
Permitted Phases					1 4 6 7	
Actuated Green, G (s)			40.9		76.0	68.8
Effective Green, g (s)			40.9		76.0	68.8
Actuated g/C Ratio			0.51		0.95	0.86
Clearance Time (s)			5.0		4.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)			1660		704	2891
v/s Ratio Prot			0.20		0.02	c0.41
v/s Ratio Perm					c0.26	
v/c Ratio			0.39		0.31	0.48
Uniform Delay, d1			11.9		0.1	1.3
Progression Factor			1.00		0.48	0.74
Incremental Delay, d2			0.7		0.1	0.0
Delay (s)			12.6		0.2	1.0
Level of Service			B		A	A
Approach Delay (s)	0.0		12.6		0.9	
Approach LOS	A		B		A	

Intersection Summary				
HCM Average Control Delay	4.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	0	74	553	683	129	271	268	0	0	463	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.85			1.00	0.97	1.00	1.00			0.94	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.94	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1126			3462	1345	1770	3539			2955	
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1126			3462	1345	1770	3539			2955	
Peak-hour factor, PHF	0.86	0.86	0.86	0.96	0.96	0.96	0.78	0.78	0.78	0.94	0.94	0.94
Adj. Flow (vph)	80	0	86	576	711	134	347	344	0	0	493	301
RTOR Reduction (vph)	0	83	0	0	0	62	0	0	0	0	93	0
Lane Group Flow (vph)	72	11	0	0	1287	72	347	344	0	0	701	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.0	25.0	13.0	38.1			21.1	
Effective Green, g (s)	3.0	3.0			25.0	25.0	13.0	38.1			21.1	
Actuated g/C Ratio	0.04	0.04			0.32	0.32	0.17	0.49			0.27	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	85	44			1115	433	297	1738			803	
v/s Ratio Prot	c0.04	0.01			c0.37		c0.20	0.10			c0.24	
v/s Ratio Perm						0.05						
v/c Ratio	1.11	0.26			1.15	0.17	1.17	0.20			0.87	
Uniform Delay, d1	37.3	36.2			26.3	18.8	32.3	11.1			27.0	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	144.2	1.1			79.9	0.8	105.9	0.0			10.0	
Delay (s)	181.5	37.3			106.2	19.7	138.2	11.2			37.0	
Level of Service	F	D			F	B	F	B			D	
Approach Delay (s)		99.9			98.0			74.9			37.0	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM Average Control Delay	77.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	15.5
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	202	496	117	0	0	0	0	333	419	464	694	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.92		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1516	4606						2950		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.12	1.00	
Satd. Flow (perm)	1516	4606						2950		216	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	224	551	130	0	0	0	0	392	493	533	798	0
RTOR Reduction (vph)	0	31	0	0	0	0	0	69	0	0	0	0
Lane Group Flow (vph)	202	672	0	0	0	0	0	816	0	533	798	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1347						863		596	2204	
v/s Ratio Prot								0.28		c0.27	0.23	
v/s Ratio Perm	0.13	0.15								c0.29		
v/c Ratio	0.46	0.50						1.05dr		0.89	0.36	
Uniform Delay, d1	30.6	31.1						36.7		27.8	9.7	
Progression Factor	1.00	1.01						1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.0						20.0		18.4	0.5	
Delay (s)	33.3	32.3						56.7		46.2	10.2	
Level of Service	C	C						E		D	B	
Approach Delay (s)		32.5			0.0			56.7			24.6	
Approach LOS		C			A			E			C	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av
Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	911	0	0	845
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3318			3318
Flt Permitted			1.00			1.00
Satd. Flow (perm)			3318			3318
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.91	0.91
Adj. Flow (vph)	0	0	959	0	0	929
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	959	0	0	929
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2800			2800
v/s Ratio Prot			c0.29			0.28
v/s Ratio Perm						
v/c Ratio			0.34			0.33
Uniform Delay, d1			2.1			2.0
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.0
Delay (s)			2.1			2.1
Level of Service			A			A
Approach Delay (s)	0.0		2.1			2.1
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	2.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av
Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	78	177	657	10	88	776
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		3.0	3.0
Lane Util. Factor			0.95		1.00	0.95
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3305		1770	3318
Flt Permitted			1.00		0.95	1.00
Satd. Flow (perm)			3305		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	192	714	11	96	843
RTOR Reduction (vph)	119	0	2	0	0	0
Lane Group Flow (vph)	158	0	723	0	96	843
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	9.0		12.9		3.9	20.8
Effective Green, g (s)	9.0		12.9		3.9	20.8
Actuated g/C Ratio	0.25		0.36		0.11	0.58
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	339		1191		193	1928
v/s Ratio Prot	c0.12		c0.22		c0.05	0.25
v/s Ratio Perm						
v/c Ratio	0.47		0.61		0.50	0.44
Uniform Delay, d1	11.4		9.4		15.0	4.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.6		0.7	0.1
Delay (s)	11.7		10.0		15.8	4.3
Level of Service	B		A		B	A
Approach Delay (s)	11.7		10.0			5.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av — Measure DD

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis
8: El Embarcadero EB & Lakeshore Av — Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	202	272	0	864	504	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	224	302	0	982	548	0
Pedestrians				12	15	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				763		
pX, platoon unblocked						
vC, conflicting volume	1054	286	548			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1054	286	548			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	57	100			
cM capacity (veh/h)	219	704	1018			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	150	377	491	491	274	274
Volume Left	150	75	0	0	0	0
Volume Right	0	302	0	0	0	0
cSH	219	489	1700	1700	1700	1700
Volume to Capacity	0.68	0.77	0.29	0.29	0.16	0.16
Queue Length 95th (ft)	108	170	0	0	0	0
Control Delay (s)	51.1	33.1	0.0	0.0	0.0	0.0
Lane LOS	F	D				
Approach Delay (s)	38.2		0.0		0.0	
Approach LOS	E					

Intersection Summary				
Average Delay	9.8			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	49	911	0	9	832
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.46	0.46	0.95	0.95	0.91	0.91
Hourly flow rate (vph)	28	107	959	0	10	914
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	1453	496			975	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1376	373			875	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	82			99	
cM capacity (veh/h)	126	587			721	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	135	639	320	315	610
Volume Left	28	0	0	10	0
Volume Right	107	0	0	0	0
cSH	332	1700	1700	721	1700
Volume to Capacity	0.41	0.38	0.19	0.01	0.36
Queue Length 95th (ft)	48	0	0	1	0
Control Delay (s)	23.0	0.0	0.0	0.5	0.0
Lane LOS	C			A	
Approach Delay (s)	23.0	0.0		0.2	
Approach LOS	C				

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	49	664	12	10	784
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	13	71	746	13	11	825
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.96					
vC, conflicting volume	1214	397			776	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1132	397			776	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	88			99	
cM capacity (veh/h)	181	594			825	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	84	497	262	11	413	413
Volume Left	13	0	0	11	0	0
Volume Right	71	0	13	0	0	0
cSH	439	1700	1700	825	1700	1700
Volume to Capacity	0.19	0.29	0.15	0.01	0.24	0.24
Queue Length 95th (ft)	17	0	0	1	0	0
Control Delay (s)	15.1	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	15.1	0.0		0.1		
Approach LOS	C					

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	32.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	56	119	581	35	53	774
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.97		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1414		3278		1767	3318
Flt Permitted	0.98		1.00		0.22	1.00
Satd. Flow (perm)	1414		3278		413	3318
Peak-hour factor, PHF	0.86	0.86	0.87	0.87	0.96	0.96
Adj. Flow (vph)	65	138	668	40	55	806
RTOR Reduction (vph)	87	0	7	0	0	0
Lane Group Flow (vph)	116	0	701	0	55	806
Confl. Peds. (#/hr)	70	31		17	17	
Confl. Bikes (#/hr)		7		15		
Parking (#/hr)	5		5			5
Turn Type					pm+pt	
Protected Phases	7		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	22.0		22.0		31.0	31.0
Effective Green, g (s)	22.0		22.0		31.0	31.0
Actuated g/C Ratio	0.37		0.37		0.52	0.52
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	518		1202		326	1714
v/s Ratio Prot	c0.08		c0.21		0.01	c0.24
v/s Ratio Perm					0.07	
v/c Ratio	0.22		0.58		0.17	0.47
Uniform Delay, d1	13.1		15.3		8.3	9.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.0		2.1		1.1	0.9
Delay (s)	14.1		17.4		9.4	10.2
Level of Service	B		B		A	B
Approach Delay (s)	14.1		17.4			10.1
Approach LOS	B		B			B

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	48.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	706	187	394	158	123	686
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		0.91	0.91	1.00	0.95
Frpb, ped/bikes	0.97		1.00	0.93	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.97		0.99	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3239		3359	1326	1770	3318
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	3239		3359	1326	1770	3318
Peak-hour factor, PHF	0.93	0.93	0.90	0.90	0.92	0.92
Adj. Flow (vph)	759	201	438	176	134	746
RTOR Reduction (vph)	31	0	3	107	0	0
Lane Group Flow (vph)	929	0	453	51	134	746
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)					5	
Turn Type				Perm	Prot	
Protected Phases	4		2		1	
Permitted Phases				2		6
Actuated Green, G (s)	26.0		26.0	26.0	19.0	48.0
Effective Green, g (s)	26.0		26.0	26.0	19.0	48.0
Actuated g/C Ratio	0.32		0.32	0.32	0.24	0.60
Clearance Time (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1053		1092	431	420	1991
v/s Ratio Prot	c0.29		c0.13		0.08	
v/s Ratio Perm				0.04		c0.22
v/c Ratio	0.88		0.41	0.12	0.32	0.37
Uniform Delay, d1	25.6		21.1	19.0	25.2	8.3
Progression Factor	1.00		1.59	4.79	1.00	1.00
Incremental Delay, d2	10.7		1.1	0.6	2.0	0.5
Delay (s)	36.2		34.7	91.3	27.2	8.8
Level of Service	D		C	F	C	A
Approach Delay (s)	36.2		49.3			11.6
Approach LOS	D		D			B

Intersection Summary				
HCM Average Control Delay	30.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Lakeshore Av & Foothill Blvd #2 — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	322	116	0	451	0	0	0	1315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5			3.0				3.0
Lane Util. Factor					0.95			0.91				*0.91
Frpb, ped/bikes					0.99			1.00				1.00
Flpb, ped/bikes					1.00			1.00				1.00
Frt					0.96			1.00				1.00
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					3095			4690				4893
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					3095			4690				4893
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.82	0.82	0.82	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	0	358	129	0	550	0	0	0	1511
RTOR Reduction (vph)	0	0	0	0	46	0	0	0	0	0	0	192
Lane Group Flow (vph)	0	0	0	0	441	0	0	550	0	0	0	1319
Confl. Peds. (#/hr)						43						
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	6%	2%	2%	2%	6%
Parking (#/hr)		0			5			5				
Turn Type												custom
Protected Phases					2			1				
Permitted Phases												1
Actuated Green, G (s)					25.5			48.0				48.0
Effective Green, g (s)					25.5			48.0				48.0
Actuated g/C Ratio					0.32			0.60				0.60
Clearance Time (s)					3.5			3.0				3.0
Lane Grp Cap (vph)					987			2814				2936
v/s Ratio Prot					c0.14			0.12				
v/s Ratio Perm												c0.27
v/c Ratio					0.45			0.20				0.45
Uniform Delay, d1					21.6			7.3				8.8
Progression Factor					1.00			1.61				1.36
Incremental Delay, d2					1.5			0.2				0.4
Delay (s)					23.1			11.8				12.3
Level of Service					C			B				B
Approach Delay (s)		0.0			23.1			11.8			12.3	
Approach LOS		A			C			B			B	

Intersection Summary				
HCM Average Control Delay	14.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	214	146	0	0	0	0	388	116	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.5				
Lane Util. Factor		0.95						0.95				
Frpb, ped/bikes		0.94						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		0.94						0.87				
Flt Protected		1.00						1.00				
Satd. Flow (prot)		2925						3080				
Flt Permitted		1.00						1.00				
Satd. Flow (perm)		2925						3080				
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	0	249	170	0	0	0	0	436	130	0	0	0
RTOR Reduction (vph)	0	113	0	0	0	0	0	35	0	0	0	0
Lane Group Flow (vph)	0	306	0	0	0	0	0	531	0	0	0	0
Confl. Peds. (#/hr)			70						17			
Confl. Bikes (#/hr)			16						4			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	4%	2%	2%	2%
Parking (#/hr)		0			0			5			0	
Turn Type												
Protected Phases		2						1				
Permitted Phases												
Actuated Green, G (s)		27.0						46.0				
Effective Green, g (s)		27.0						46.0				
Actuated g/C Ratio		0.34						0.58				
Clearance Time (s)		3.5						3.5				
Lane Grp Cap (vph)		987						1771				
v/s Ratio Prot		c0.10						c0.17				
v/s Ratio Perm												
v/c Ratio		0.31						0.30				
Uniform Delay, d1		19.6						8.7				
Progression Factor		1.16						1.00				
Incremental Delay, d2		0.8						0.4				
Delay (s)		23.5						9.2				
Level of Service		C						A				
Approach Delay (s)		23.5			0.0			9.2			0.0	
Approach LOS		C			A			A			A	

Intersection Summary				
HCM Average Control Delay	15.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.30			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	431	5	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	468	5	0	0
Pedestrians	70					70
Lane Width (ft)	12.0					0.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			219			149
pX, platoon unblocked						
vC, conflicting volume	541	299			544	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	541	299			544	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	444	657			962	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3
Volume Total	17	187	187	99
Volume Left	0	0	0	0
Volume Right	17	0	0	5
cSH	657	1700	1700	1700
Volume to Capacity	0.03	0.11	0.11	0.06
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	10.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.6	0.0		
Approach LOS	B			

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	32.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	37	419	14	19	30	0	0	19	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.61	0.61	0.61	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	42	476	16	31	49	0	0	21	22
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	495			28			406	605	26	596	597	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			28			406	605	26	596	597	274
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			93	87	100	100	95	97
cM capacity (veh/h)	1062			1552			462	390	1021	336	394	722

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	280	254	80	44
Volume Left	42	0	31	0
Volume Right	0	16	0	22
cSH	1552	1700	415	513
Volume to Capacity	0.03	0.15	0.19	0.09
Queue Length 95th (ft)	2	0	18	7
Control Delay (s)	1.3	0.0	15.7	12.7
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.7	12.7
Approach LOS			C	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	29.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	224	84	0	0	0	0	28	19	9	53	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.59	0.59	0.59	0.78	0.78	0.78
Hourly flow rate (vph)	20	246	92	0	0	0	0	47	32	12	68	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	17			365			393	376	226	266	422	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			287			315	297	143	184	345	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	92	96	98	87	100
cM capacity (veh/h)	1576			1208			507	566	833	631	533	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	143	215	80	79
Volume Left	20	0	0	12
Volume Right	0	92	32	0
cSH	1576	1700	651	545
Volume to Capacity	0.01	0.13	0.12	0.15
Queue Length 95th (ft)	1	0	10	13
Control Delay (s)	1.1	0.0	11.3	12.7
Lane LOS	A		B	B
Approach Delay (s)	0.4		11.3	12.7
Approach LOS			B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave — Measure DD

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	16	124	188	4	6	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	135	204	4	7	35
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				516	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				516	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	94
cM capacity (veh/h)	1209				454	618

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	152	209	41
Volume Left	17	0	7
Volume Right	0	4	35
cSH	1209	1700	584
Volume to Capacity	0.01	0.12	0.07
Queue Length 95th (ft)	1	0	6
Control Delay (s)	1.0	0.0	11.6
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	11.6
Approach LOS			B

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	416	54	408	86	0	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.5	4.0		3.5
Lane Util. Factor	0.97		0.91	0.91		1.00
Frpb, ped/bikes	0.99		1.00	0.98		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3300		3251	1388		1568
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3300		3251	1388		1568
Peak-hour factor, PHF	0.85	0.85	0.91	0.91	0.69	0.69
Adj. Flow (vph)	489	64	448	97	0	148
RTOR Reduction (vph)	11	0	2	0	0	0
Lane Group Flow (vph)	542	0	456	87	0	148
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				5
Turn Type				Free		
Protected Phases	2		1			1
Permitted Phases				Free		
Actuated Green, G (s)	45.0		45.0	97.0		45.0
Effective Green, g (s)	45.0		45.0	97.0		45.0
Actuated g/C Ratio	0.46		0.46	1.00		0.46
Clearance Time (s)	3.5		3.5			3.5
Lane Grp Cap (vph)	1531		1508	1388		727
v/s Ratio Prot	c0.16					
v/s Ratio Perm			c0.14	0.06		0.09
v/c Ratio	0.35		0.30	0.06		0.20
Uniform Delay, d1	16.7		16.2	0.0		15.4
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.6		0.5	0.1		0.6
Delay (s)	17.3		16.7	0.1		16.0
Level of Service	B		B	A		B
Approach Delay (s)	17.3		14.1			16.0
Approach LOS	B		B			B

Intersection Summary					
HCM Average Control Delay	15.7	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.33				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		7.0	
Intersection Capacity Utilization	64.2%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1	28	10	317	22	19	38	10	18	60	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.93			0.99			0.99			0.95	
Flpb, ped/bikes		0.99			1.00			0.99			0.99	
Frt		0.89			0.99			0.98			0.92	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		2681			3198			1530			1400	
Flt Permitted		0.87			0.95			0.92			0.98	
Satd. Flow (perm)		2364			3041			1433			1380	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	30	11	345	24	21	41	11	20	65	137
RTOR Reduction (vph)	0	24	0	0	16	0	0	3	0	0	36	0
Lane Group Flow (vph)	0	18	0	0	364	0	0	70	0	0	186	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		12.5			12.5			46.5			46.5	
Effective Green, g (s)		12.5			12.5			46.5			46.5	
Actuated g/C Ratio		0.19			0.19			0.72			0.72	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		455			585			1025			987	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.12			0.05			c0.13	
v/c Ratio		0.04			0.62			0.07			0.19	
Uniform Delay, d1		21.4			24.1			2.8			3.0	
Progression Factor		1.00			0.49			1.18			1.00	
Incremental Delay, d2		0.0			1.3			0.1			0.4	
Delay (s)		21.4			13.1			3.4			3.5	
Level of Service		C			B			A			A	
Approach Delay (s)		21.4			13.1			3.4			3.5	
Approach LOS		C			B			A			A	

Intersection Summary					
HCM Average Control Delay	9.6	HCM Level of Service		A	
HCM Volume to Capacity ratio	0.28				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)		6.0	
Intersection Capacity Utilization	53.9%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave — Measure DD

Movement	WBL2	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2	NEL	NER
Lane Configurations												
Volume (vph)	30	526	0	17	30	40	10	44	43	20	50	224
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Util. Factor		0.95	1.00			1.00			1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	0.90			0.99			1.00	0.92	1.00	1.00
Flpb, ped/bikes		1.00	1.00			0.96			0.97	1.00	0.97	1.00
Frt		1.00	0.85			0.98			1.00	0.85	0.90	1.00
Flt Protected		1.00	1.00			0.98			0.98	1.00	0.98	1.00
Satd. Flow (prot)		3515	1243			1499			1764	1268	1610	1770
Flt Permitted		1.00	1.00			0.88			0.84	1.00	0.98	1.00
Satd. Flow (perm)		3515	1243			1345			1511	1268	1610	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	572	0	18	33	43	11	48	47	22	54	243
RTOR Reduction (vph)	0	0	9	0	0	7	0	0	0	0	0	0
Lane Group Flow (vph)	0	605	9	0	0	80	0	0	95	22	151	146
Confl. Peds. (#/hr)	70			70	70		70	70		70	70	
Confl. Bikes (#/hr)				16			16			16		
Parking (#/hr)			5			5				5		
Turn Type	Perm		Perm		Perm		Perm		Perm			custom
Protected Phases		1				2			2			
Permitted Phases	1		1		2		2			2	1	1
Actuated Green, G (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Effective Green, g (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Actuated g/C Ratio		0.51	0.51			0.35			0.35	0.35	0.51	0.51
Clearance Time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Grp Cap (vph)		1785	631			476			535	449	817	899
v/s Ratio Prot												
v/s Ratio Perm		0.17	0.01			0.06			c0.06	0.02	0.09	0.08
v/c Ratio		0.34	0.01			0.17			0.18	0.05	0.18	0.16
Uniform Delay, d1		9.5	7.9			14.4			14.5	13.8	8.7	8.6
Progression Factor		2.21	1.00			1.00			0.95	0.96	1.00	1.00
Incremental Delay, d2		0.4	0.0			0.8			0.7	0.2	0.5	0.4
Delay (s)		21.5	8.0			15.2			14.5	13.5	9.2	9.0
Level of Service		C	A			B			B	B	A	A
Approach Delay (s)		21.1				15.2			14.3		9.0	
Approach LOS		C				B			B		A	

Intersection Summary					
HCM Average Control Delay	16.4	HCM Level of Service		B	
HCM Volume to Capacity ratio	0.27				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)		9.0	
Intersection Capacity Utilization	80.8%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave — Measure DD

Movement	NER2
Lane Configurations	
Volume (vph)	50
Ideal Flow (vphpl)	1900
Total Lost time (s)	3.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.90
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1421
Flt Permitted	1.00
Satd. Flow (perm)	1421
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	54
RTOR Reduction (vph)	0
Lane Group Flow (vph)	54
Confl. Peds. (#/hr)	70
Confl. Bikes (#/hr)	16
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	1
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.51
Clearance Time (s)	3.0
Lane Grp Cap (vph)	721
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.07
Uniform Delay, d1	8.2
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	8.4
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↑			↓	
Volume (vph)	0	0	0	80	442	53	19	143	0	0	198	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3219			1655			1651	
Flt Permitted					0.99			0.96			1.00	
Satd. Flow (perm)					3219			1599			1651	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	87	480	58	21	155	0	0	215	15
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	613	0	0	176	0	0	226	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1337			775			800	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.19			0.11				
v/c Ratio					0.46			0.23			0.28	
Uniform Delay, d1					13.7			9.7			10.0	
Progression Factor					1.00			0.99			1.00	
Incremental Delay, d2					1.1			0.7			0.9	
Delay (s)					14.9			10.3			10.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			14.9			10.3			10.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	9	226	21	40	650	28	28	120	38	37	291	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3283			3310			1590			1626	
Flt Permitted		0.93			0.93			0.92			0.96	
Satd. Flow (perm)		3066			3073			1468			1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	246	23	43	707	30	30	130	41	40	316	43
RTOR Reduction (vph)	0	10	0	0	4	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	269	0	0	776	0	0	187	0	0	392	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1391			1395			632			673	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.25			0.13			c0.25	
v/c Ratio		0.19			0.56			0.30			0.58	
Uniform Delay, d1		10.6			13.0			12.1			14.1	
Progression Factor		1.00			1.00			1.03			0.74	
Incremental Delay, d2		0.3			1.6			1.1			3.6	
Delay (s)		11.0			14.6			13.5			13.9	
Level of Service		B			B			B			B	
Approach Delay (s)		11.0			14.6			13.5			13.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	16	260	45	50	595	57	44	165	48	44	293	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3235			3273			1591			1624	
Flt Permitted		0.92			0.91			0.90			0.94	
Satd. Flow (perm)		2972			2979			1450			1533	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	283	49	54	647	62	48	179	52	48	318	43
RTOR Reduction (vph)	0	20	0	0	10	0	0	13	0	0	7	0
Lane Group Flow (vph)	0	329	0	0	753	0	0	266	0	0	402	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1509			1512			558			590	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.25			0.18			c0.26	
v/c Ratio		0.22			0.50			0.48			0.68	
Uniform Delay, d1		8.9			10.5			15.1			16.7	
Progression Factor		0.81			1.00			0.67			0.74	
Incremental Delay, d2		0.3			1.2			2.8			5.4	
Delay (s)		7.5			11.7			12.9			17.7	
Level of Service		A			B			B			B	
Approach Delay (s)		7.5			11.7			12.9			17.7	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	12.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	69.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av

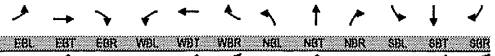
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↔		↰	↑↑↔			↱	↱		↕	
Volume (vph)	65	212	36	79	530	10	53	194	32	15	286	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.91		0.99	
Flpb, ped/bikes	0.96	1.00		0.94	1.00			0.99	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1703	4726		1663	4891			1647	1448		1607	
Flt Permitted	0.40	1.00		0.58	1.00			0.87	1.00		0.99	
Satd. Flow (perm)	712	4726		1014	4891			1445	1448		1588	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	230	39	86	576	11	58	211	35	16	311	68
RTOR Reduction (vph)	0	22	0	0	3	0	0	0	19	0	11	0
Lane Group Flow (vph)	71	247	0	86	584	0	0	269	16	0	384	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	307	2036		437	2107			667	668		733	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm	0.10			0.08				0.19	0.01		c0.24	
v/c Ratio	0.23	0.12		0.20	0.28			0.40	0.02		0.52	
Uniform Delay, d1	11.7	11.1		11.5	12.0			11.6	9.5		12.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.53	
Incremental Delay, d2	1.8	0.1		1.0	0.3			1.8	0.1		2.1	
Delay (s)	13.5	11.2		12.5	12.3			13.4	9.6		8.7	
Level of Service	B	B		B	B			B	A		A	
Approach Delay (s)		11.7			12.3			13.0			8.7	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM Average Control Delay	11.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av

Measure DD



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	99	2	1	248	240	1	1	1	266	2	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	108	2	1	270	261	1	1	1	289	2	76

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	129	271	261	3	291	76
Volume Left (vph)	20	1	0	1	289	0
Volume Right (vph)	2	0	261	1	0	76
Hadj (s)	0.05	0.04	-0.67	-0.10	0.53	-0.67
Departure Headway (s)	6.4	5.9	5.2	6.8	6.7	5.5
Degree Utilization, x	0.23	0.45	0.38	0.01	0.54	0.12
Capacity (veh/h)	532	586	664	475	515	617
Control Delay (s)	11.3	12.4	10.2	9.8	16.2	8.0
Approach Delay (s)	11.3	11.3		9.8	14.5	
Approach LOS	B	B		A	B	

Intersection Summary				
Delay	12.5			
HCM Level of Service	B			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr

Measure DD

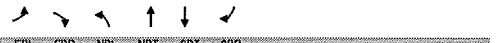
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	52	0	0	926	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	68	0	0	1040	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	417	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	564	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3
Volume Total	34	34	347	347	347
Volume Left	34	34	0	0	0
Volume Right	0	0	0	0	0
cSH	564	564	1700	1700	1700
Volume to Capacity	0.06	0.06	0.20	0.20	0.20
Queue Length 95th (ft)	5	5	0	0	0
Control Delay (s)	11.8	11.8	0.0	0.0	0.0
Lane LOS	B	B			
Approach Delay (s)	11.8		0.0		
Approach LOS	B				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	60.7%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St

Measure DD



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	0	0	644	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	36	0	0	959	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	310	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	647	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	36	240	240	240	240
Volume Left	36	0	0	0	0
Volume Right	0	0	0	0	0
cSH	647	1700	1700	1700	1700
Volume to Capacity	0.06	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St
Measure DD

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	0	324	383	25	126	839	142	82	74	129	120	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.86		
Flpb, ped/bikes		1.00	1.00		0.98	1.00			0.97	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.92		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3277		1734	3063			1558	2516		
Flt Permitted		0.21	1.00		0.50	1.00			0.42	0.94		
Satd. Flow (perm)		761	3277		904	3063			695	2374		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	352	416	27	137	912	154	89	80	140	130	36
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	0	11	0	0
Lane Group Flow (vph)	0	361	438	0	137	1146	0	0	72	303	0	0
Confl. Peds. (#/hr)				70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Perm				Perm			
Protected Phases		5	2			6				4		
Permitted Phases	5				6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		161	1857		271	919			224	765		
v/s Ratio Prot			0.13			c0.37						
v/s Ratio Perm		c0.47			0.15				0.10	0.13		
v/c Ratio		2.24	0.24		0.51	1.25			0.32	0.40		
Uniform Delay, d1		35.5	9.8		26.0	31.5			23.1	23.7		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		578.5	0.3		6.6	121.2			3.8	1.5		
Delay (s)		614.0	10.1		32.6	152.7			26.8	25.2		
Level of Service		F	B		C	F			C	C		
Approach Delay (s)			281.2			140.0				25.5		
Approach LOS			F			F				C		

Intersection Summary			
HCM Average Control Delay	146.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	114.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St
Measure DD

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	58	21	179	151
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.97	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3122	
Flt Permitted			0.80	
Satd. Flow (perm)			2526	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	23	195	164
RTOR Reduction (vph)	0	0	94	0
Lane Group Flow (vph)	0	0	351	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			814	
v/s Ratio Prot				
v/s Ratio Perm			c0.14	
v/c Ratio			0.43	
Uniform Delay, d1			24.0	
Progression Factor			1.00	
Incremental Delay, d2			1.7	
Delay (s)			25.7	
Level of Service			C	
Approach Delay (s)			25.7	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	169	64	564	604	106	109	804	311	37	959	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.96			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3257		3400	3364			5005	1464		4711	
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.82	
Satd. Flow (perm)	3433	3257		3400	3364			3322	1464		3884	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	58	171	65	613	657	115	118	874	338	41	1066	116
RTOR Reduction (vph)	0	18	0	0	14	0	0	0	234	0	12	0
Lane Group Flow (vph)	58	218	0	613	758	0	0	992	104	0	1211	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			5			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Effective Green, g (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Actuated g/C Ratio	0.05	0.15		0.37	0.47			0.31	0.31		0.31	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	198	482		1255	1585			1019	449		1191	
v/s Ratio Prot	0.02	c0.07		0.18	c0.23							
v/s Ratio Perm								0.30	0.07		c0.31	
v/c Ratio	0.29	0.45		0.49	0.48			1.34dl	0.23		1.02	
Uniform Delay, d1	38.4	33.1		20.7	15.4			29.2	22.0		29.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.2		0.1	1.0			21.7	0.1		30.2	
Delay (s)	38.7	33.3		20.8	16.4			50.9	22.1		59.7	
Level of Service	D	C		C	B			D	C		E	
Approach Delay (s)		34.4			18.3			43.6			59.7	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	39.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
32: Harrison St & Lakeside Dr
Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations								
Volume (vph)	370	0	0	831	0	577	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0		4.0		
Lane Util. Factor	0.94			0.91		*0.95		
Frt	1.00			1.00		1.00		
Flt Protected	0.95			1.00		1.00		
Satd. Flow (prot)	4802			4916		3539		
Flt Permitted	0.95			1.00		1.00		
Satd. Flow (perm)	4802			4916		3539		
Peak-hour factor, PHF	0.96	0.96	0.94	0.94	0.89	0.89	0.92	0.92
Adj. Flow (vph)	385	0	0	884	0	648	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	385	0	0	884	0	648	0	0
Heavy Vehicles (%)	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)				0	0			
Turn Type						custom		
Protected Phases	2			1		1		
Permitted Phases								
Actuated Green, G (s)	25.0			46.0		46.0		
Effective Green, g (s)	25.0			46.0		46.0		
Actuated g/C Ratio	0.31			0.58		0.58		
Clearance Time (s)	5.0			4.0		4.0		
Lane Grp Cap (vph)	1501			2827		2035		
v/s Ratio Prot	c0.08			0.18		c0.18		
v/s Ratio Perm								
v/c Ratio	0.26			0.31		0.32		
Uniform Delay, d1	20.6			8.8		8.8		
Progression Factor	0.57			1.00		0.79		
Incremental Delay, d2	0.4			0.3		0.3		
Delay (s)	12.1			9.1		7.4		
Level of Service	B			A		A		
Approach Delay (s)	12.1			9.1	7.4		0.0	
Approach LOS	B			A	A		A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	30.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway

Measure DD

Movement	EBT	EBR	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	NBR2	SBR
Lane Configurations												
Volume (vph)	95	34	113	445	286	40	94	56	0	304	17	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	0.91	*0.95		0.91	0.91	1.00			0.95	0.95		1.00
Frpb, ped/bikes	1.00	0.88		1.00	1.00	1.00			1.00	0.91		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00
Frt	0.96	1.00		1.00	1.00	0.85			0.94	1.00		0.86
Flt Protected	1.00	1.00		0.95	0.98	1.00			0.97	1.00		1.00
Satd. Flow (prot)	3156	1361		1610	3247	1583			1618	1402		1611
Flt Permitted	1.00	1.00		0.95	0.78	1.00			0.97	1.00		1.00
Satd. Flow (perm)	3156	1361		1610	2600	1583			1618	1402		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	37	123	484	311	43	102	61	0	330	18	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	127	0	261	534	43	0	0	265	246	0	33
Confl. Peds. (#/hr)			70				70				70	
Confl. Bikes (#/hr)			16								16	
Heavy Vehicles (%)	6%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5								5		
Turn Type		Perm		Prot		Perm	Perm	Split		Perm		custom
Protected Phases	1			2	6			8	8			5
Permitted Phases		1				6	8			8		
Actuated Green, G (s)	20.0	20.0		17.0	29.0	29.0			23.0	23.0		8.0
Effective Green, g (s)	20.0	20.0		17.0	29.0	29.0			23.0	23.0		8.0
Actuated g/C Ratio	0.25	0.25		0.21	0.36	0.36			0.29	0.29		0.10
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Grp Cap (vph)	790	340		342	1080	574			465	403		161
v/s Ratio Prot	0.04			c0.16	0.11				0.16			0.02
v/s Ratio Perm		c0.09			c0.07	0.03				c0.18		
v/c Ratio	0.17	0.37		0.76	0.49	0.07			0.57	0.61		0.20
Uniform Delay, d1	23.5	24.8		29.6	19.8	16.7			24.3	24.6		33.1
Progression Factor	1.00	1.00		1.28	1.34	1.31			1.00	1.00		1.00
Incremental Delay, d2	0.5	3.1		13.0	1.4	0.2			5.0	6.7		2.9
Delay (s)	24.0	27.9		50.9	27.9	22.1			29.3	31.4		35.9
Level of Service	C	C		D	C	C			C	C		D
Approach Delay (s)	25.9				34.8				30.3			
Approach LOS	C				C				C			

Intersection Summary				
HCM Average Control Delay	35.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	63.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway

Measure DD

Movement	SER2	NWL2	NWL	NWT
Lane Configurations				
Volume (vph)	10	23	92	30
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00
Frt	0.86	1.00	1.00	1.00
Flt Protected	1.00	0.95	0.95	0.98
Satd. Flow (prot)	1611	1770	1649	1709
Flt Permitted	1.00	0.95	0.95	0.98
Satd. Flow (perm)	1611	1770	1649	1709
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	25	100	33
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	11	25	66	67
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Heavy Vehicles (%)	2%	2%	4%	2%
Parking (#/hr)				
Turn Type	Free	Split	Split	
Protected Phases		7	7	
Permitted Phases	Free			
Actuated Green, G (s)	80.0	4.0	4.0	4.0
Effective Green, g (s)	80.0	4.0	4.0	4.0
Actuated g/C Ratio	1.00	0.05	0.05	0.05
Clearance Time (s)		4.0	4.0	4.0
Lane Grp Cap (vph)	1611	89	82	85
v/s Ratio Prot		0.01	c0.04	0.04
v/s Ratio Perm	0.01			
v/c Ratio	0.01	0.28	0.80	0.79
Uniform Delay, d1	0.0	36.6	37.6	37.6
Progression Factor	1.00	0.78	0.78	0.78
Incremental Delay, d2	0.0	7.6	55.1	50.9
Delay (s)	0.0	36.0	84.6	80.3
Level of Service	A	D	F	F
Approach Delay (s)				75.1
Approach LOS				E

Intersection Summary

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	138	4	1	745	342	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.98	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.94	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1519			3318	3060	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1519			3167	3060	
Peak-hour factor, PHF	0.85	0.85	0.97	0.97	0.85	0.85
Adj. Flow (vph)	162	5	1	768	402	244
RTOR Reduction (vph)	3	0	0	0	125	0
Lane Group Flow (vph)	164	0	0	769	521	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type		custom				
Protected Phases	4			2	6	
Permitted Phases			2	2		
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	540			1548	1496	
v/s Ratio Prot	c0.11				0.17	
v/s Ratio Perm				c0.24		
v/c Ratio	0.30			0.50	0.35	
Uniform Delay, d1	10.5			7.8	7.1	
Progression Factor	1.00			0.59	1.00	
Incremental Delay, d2	1.5			1.1	0.6	
Delay (s)	11.9			5.7	7.7	
Level of Service	B			A	A	
Approach Delay (s)	11.9			5.7	7.7	
Approach LOS	B			A	A	

Intersection Summary				
HCM Average Control Delay	7.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	38.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & Madison St

Measure DD

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	374	6	0	0	0	0	181	766	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		3318						3318	3318		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		3318						3318	3316		
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92
Adj. Flow (vph)	0	416	7	0	0	0	0	199	831	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	423	0	0	0	0	0	199	831	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		1253						1585	3060		
v/s Ratio Prot		c0.13						0.06			
v/s Ratio Perm									c0.25		
v/c Ratio		0.34						0.13	0.27		
Uniform Delay, d1		10.0						6.5	0.2		
Progression Factor		1.72						1.12	1.00		
Incremental Delay, d2		0.7						0.1	0.2		
Delay (s)		17.9						7.4	0.4		
Level of Service		B						A	A		
Approach Delay (s)	17.9				0.0			1.7		0.0	
Approach LOS	B				A			A		A	

Intersection Summary				
HCM Average Control Delay	6.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.30			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	29.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑			↑↑↑	
Volume (vph)	0	25	101	0	0	0	0	0	0	46	341	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2758									4795	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2758									4795	
Peak-hour factor, PHF	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Adj. Flow (vph)	0	33	135	0	0	0	0	0	0	57	421	0
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	77	0	0	0	0	0	0	0	0	451	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		889									2557	
v/s Ratio Prot		c0.03										
v/s Ratio Perm											0.09	
v/c Ratio		0.09									0.18	
Uniform Delay, d1		10.6									5.4	
Progression Factor		1.00									2.49	
Incremental Delay, d2		0.2									0.1	
Delay (s)		10.8									13.6	
Level of Service		B									B	
Approach Delay (s)		10.8			0.0			0.0			13.6	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	12.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.14			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	35.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰	↑↑↑	
Volume (vph)	0	135	85	70	652	0	0	0	0	191	280	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		2999			3238					1265	3121	
Flt Permitted		1.00			0.90					0.95	0.99	
Satd. Flow (perm)		2999			2940					1265	3121	
Peak-hour factor, PHF	0.96	0.96	0.96	0.82	0.82	0.82	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	141	89	85	795	0	0	0	0	205	301	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	183	0	0	880	0	0	0	0	164	342	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type			Perm							Perm		
Protected Phases		2			2						1	
Permitted Phases			2							1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1400			1372					478	1179	
v/s Ratio Prot		0.06										
v/s Ratio Perm					c0.30					c0.13	0.11	
v/c Ratio		0.13			0.64					0.34	0.29	
Uniform Delay, d1		6.8			9.1					10.0	9.8	
Progression Factor		1.00			1.55					1.68	1.63	
Incremental Delay, d2		0.2			1.6					1.9	0.6	
Delay (s)		7.0			15.8					18.8	16.5	
Level of Service		A			B					B	B	
Approach Delay (s)		7.0			15.8			0.0			17.3	
Approach LOS		A			B			A			B	

Intersection Summary				
HCM Average Control Delay	15.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	56.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑↑↑				
Volume (vph)	52	295	0	0	655	508	127	435	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			3.5				
Lane Util. Factor		0.95			0.95			0.86				
Frpb, ped/bikes		1.00			0.96			1.00				
Flpb, ped/bikes		1.00			1.00			0.98				
Frt		1.00			0.93			0.99				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3163			3131			5910				
Flt Permitted		0.68			1.00			0.99				
Satd. Flow (perm)		2182			3131			5910				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	56	317	0	0	689	535	138	473	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	78	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	373	0	0	1146	0	0	624	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm						Perm					
Protected Phases		1			1			2				
Permitted Phases	1						2					
Actuated Green, G (s)		19.5			19.5			17.0				
Effective Green, g (s)		19.5			19.5			17.0				
Actuated g/C Ratio		0.43			0.43			0.38				
Clearance Time (s)		5.0			5.0			3.5				
Lane Grp Cap (vph)		946			1357			2233				
v/s Ratio Prot					c0.37							
v/s Ratio Perm		0.17						0.11				
v/c Ratio		0.39			0.84			0.28				
Uniform Delay, d1		8.7			11.4			9.7				
Progression Factor		1.45			1.00			0.47				
Incremental Delay, d2		1.2			6.6			0.3				
Delay (s)		13.8			18.0			4.9				
Level of Service		B			B			A				
Approach Delay (s)		13.8			18.0			4.9			0.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	13.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	68.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	408	82	0	0	0	0	0	0	78	282	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5939									4714	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5939									4714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	443	89	0	0	0	0	0	0	85	307	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	485	0	0	0	0	0	0	0	0	339	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2772									1781	
v/s Ratio Prot		c0.08										
v/s Ratio Perm											0.07	
v/c Ratio		0.17									0.19	
Uniform Delay, d1		7.0									9.4	
Progression Factor		1.00									1.57	
Incremental Delay, d2		0.1									0.2	
Delay (s)		7.1									15.0	
Level of Service		A									B	
Approach Delay (s)		7.1			0.0			0.0			15.0	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.18			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	27.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	314	0	0	0	0	0	591	160	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0				
Lane Util. Factor	1.00	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.98				
Flpb, ped/bikes	0.98	1.00						1.00				
Frt	1.00	1.00						0.97				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	1512	4873						5863				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	1512	4873						5863				
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	54	413	0	0	0	0	0	664	180	0	0	0
RTOR Reduction (vph)	29	0	0	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	25	413	0	0	0	0	0	736	0	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm											
Protected Phases		2						1				
Permitted Phases	2											
Actuated Green, G (s)	20.5	20.5						18.0				
Effective Green, g (s)	20.5	20.5						18.0				
Actuated g/C Ratio	0.46	0.46						0.40				
Clearance Time (s)	3.5	3.5						3.0				
Lane Grp Cap (vph)	689	2220						2345				
v/s Ratio Prot		c0.08						c0.13				
v/s Ratio Perm	0.02											
v/c Ratio	0.04	0.19						0.31				
Uniform Delay, d1	6.8	7.3						9.3				
Progression Factor	0.85	0.79						2.59				
Incremental Delay, d2	0.1	0.2						0.3				
Delay (s)	5.9	5.9						24.3				
Level of Service	A	A						C				
Approach Delay (s)		5.9			0.0			24.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	17.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	48.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	378	1217	0	0	0	0	0	358	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.97	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5917						4623	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5917						4623	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	420	1352	0	0	0	0	0	411	98
RTOR Reduction (vph)	0	0	0	0	124	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	1648	0	0	0	0	0	496	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2781						1746	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.28							
v/c Ratio					0.60						0.28	
Uniform Delay, d1					8.9						9.8	
Progression Factor					0.19						1.53	
Incremental Delay, d2					0.8						0.4	
Delay (s)					2.5						15.3	
Level of Service					A						B	
Approach Delay (s)		0.0			2.5			0.0			15.3	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	6.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	42.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1438	78	185	650	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5934			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5934			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1546	84	199	699	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1613	0	0	894	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					2505			2305				
v/s Ratio Prot					c0.27							
v/s Ratio Perm								c0.15				
v/c Ratio					0.64			0.39				
Uniform Delay, d1					10.3			9.9				
Progression Factor					1.00			1.71				
Incremental Delay, d2					1.3			0.5				
Delay (s)					11.6			17.4				
Level of Service					B			B				
Approach Delay (s)		0.0			11.6			17.4			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	13.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	42.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St
Measure DD

Movement	SBL	SBT	SBR	SET	SER
Lane Configurations					
Volume (vph)	58	652	26	282	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.98	
Flpb, ped/bikes		0.99	1.00	1.00	
Frt		1.00	1.00	0.97	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4787	1548	4483	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4787	1548	4483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	709	28	317	96
RTOR Reduction (vph)	0	0	0	54	0
Lane Group Flow (vph)	0	772	28	359	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1808	619	1793	
v/s Ratio Prot			0.02	c0.08	
v/s Ratio Perm		0.16			
v/c Ratio		0.43	0.05	0.20	
Uniform Delay, d1		10.4	8.2	8.8	
Progression Factor		1.26	1.00	1.00	
Incremental Delay, d2		0.7	0.1	0.3	
Delay (s)		13.8	8.4	9.1	
Level of Service		B	A	A	
Approach Delay (s)		13.8		9.0	
Approach LOS		B		A	

Intersection Summary				
HCM Average Control Delay	12.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	35.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↱	
Volume (vph)	0	0	0	84	302	0	0	0	0	98	694	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						0.99	
Satd. Flow (prot)					3194						4709	
Flt Permitted					0.99						0.99	
Satd. Flow (perm)					3194						4709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	91	328	0	0	0	0	107	754	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	0	419	0	0	0	0	0	907	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1136						2407	
v/s Ratio Prot												
v/s Ratio Perm					0.13						0.19	
v/c Ratio					0.37						0.38	
Uniform Delay, d1					10.8						6.7	
Progression Factor					1.01						0.30	
Incremental Delay, d2					0.9						0.4	
Delay (s)					11.7						2.4	
Level of Service					B						A	
Approach Delay (s)		0.0			11.7			0.0			2.4	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	5.3	HCM Level of Service		A
HCM Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	35.8%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↱			↰↑↑↱				
Volume (vph)	8	66	0	0	212	78	104	706	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3281			1535			5971				
Flt Permitted		0.91			1.00			0.99				
Satd. Flow (perm)		3021			1535			5971				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	61	0	0	230	85	113	767	100	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	286	0	0	937	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1007			512			2919				
v/s Ratio Prot					c0.19							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.07			0.56			0.32				
Uniform Delay, d1		10.2			12.3			7.0				
Progression Factor		1.84			1.00			0.76				
Incremental Delay, d2		0.1			4.3			0.3				
Delay (s)		19.0			16.6			5.5				
Level of Service		B			B			A				
Approach Delay (s)		19.0			16.6			5.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.8	HCM Level of Service		A
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↱						↰↑↑↱	
Volume (vph)	0	0	0	146	513	0	0	0	0	0	826	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6025						4741	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6025						4741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	159	558	0	0	0	0	0	898	86
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	665	0	0	0	0	0	959	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2276						2212	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.43	
Uniform Delay, d1					9.8						8.0	
Progression Factor					1.21						0.80	
Incremental Delay, d2					0.3						0.6	
Delay (s)					12.2						7.1	
Level of Service					B						A	
Approach Delay (s)		0.0			12.2			0.0			7.1	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.2	HCM Level of Service		A
HCM Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	34.5%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

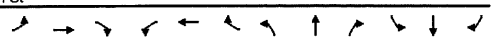
HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↱↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	472	86	185	990	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.98			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5959			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5959			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	513	93	201	1076	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	21	0	0	75	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	585	0	0	1202	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2384			2563				
v/s Ratio Prot					c0.10							
v/s Ratio Perm								0.20				
v/c Ratio					0.25			0.47				
Uniform Delay, d1					9.0			9.4				
Progression Factor					1.00			2.18				
Incremental Delay, d2					0.2			0.4				
Delay (s)					9.2			20.8				
Level of Service					A			C				
Approach Delay (s)		0.0			9.2			20.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service		B
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	38.8%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St

Measure DD

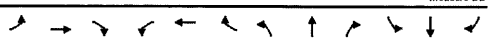


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	591	356	0	0	0	0	0	0	236	745	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.94									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5676									4713	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5676									4713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	642	387	0	0	0	0	0	0	257	810	0
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	98	0
Lane Group Flow (vph)	0	988	0	0	0	0	0	0	0	0	969	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2523									1885	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.21	
v/c Ratio		0.39									0.51	
Uniform Delay, d1		8.4									10.2	
Progression Factor		1.00									2.30	
Incremental Delay, d2		0.5									0.9	
Delay (s)		8.9									24.4	
Level of Service		A									C	
Approach Delay (s)		8.9			0.0			0.0			24.4	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St

Measure DD



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	675	0	0	0	0	0	1106	263	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6065						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6065						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	734	0	0	0	0	0	1202	308	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	58	0	0	0	0
Lane Group Flow (vph)	0	866	0	0	0	0	0	1452	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2426						1846				
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.14										
v/c Ratio		0.36						0.79				
Uniform Delay, d1		9.4						11.8				
Progression Factor		1.05						1.00				
Incremental Delay, d2		0.4						3.5				
Delay (s)		10.3						15.3				
Level of Service		B						B				
Approach Delay (s)		10.3			0.0			15.3			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	268	191	475	219	345	462	180	51	555	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.98			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.96	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1606	1441	1736	3539	1286	1610	2969			3516	1297
Flt Permitted		0.44	1.00	0.63	1.00	1.00	0.95	0.91			0.83	1.00
Satd. Flow (perm)		725	1441	1150	3539	1286	1610	2707			2919	1297
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	95	11	295	215	534	246	371	497	194	55	597	305
RTOR Reduction (vph)	0	14	180	0	0	140	0	38	0	0	0	36
Lane Group Flow (vph)	0	130	77	215	534	106	334	690	0	0	652	269
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		218	432	345	1062	386	242	1664			1184	526
v/s Ratio Prot					0.15		c0.21	0.06				
v/s Ratio Perm		0.18	0.05	c0.19		0.08		0.19			c0.22	0.21
v/c Ratio		0.60	0.18	0.62	0.50	0.27	1.38	0.41			0.55	0.51
Uniform Delay, d1		26.9	23.3	27.1	26.0	24.0	38.2	9.6			20.5	20.1
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.87	2.98			1.00	1.00
Incremental Delay, d2		11.5	0.9	8.2	1.7	1.8	190.8	0.6			1.8	3.5
Delay (s)		38.3	24.2	35.3	27.7	25.8	224.0	29.2			22.3	23.6
Level of Service		D	C	D	C	C	F	C			C	C
Approach Delay (s)		29.3			28.9			90.5			22.7	
Approach LOS		C			C			F			C	

Intersection Summary				
HCM Average Control Delay	46.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	98.3%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	433	517	0	0	0	0	599	566	371	568	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.94						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4338						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4338						3539	1296	1770	3318	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	270	481	574	0	0	0	0	631	596	417	638	0
RTOR Reduction (vph)	0	153	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1172	0	0	0	0	0	631	596	417	638	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1446						1003	1296	423	1880	
v/s Ratio Prot								c0.18		c0.24		
v/s Ratio Perm		0.27							0.46		0.19	
v/c Ratio		0.81dr						0.63	0.46	0.99	0.34	
Uniform Delay, d1		27.4						28.1	0.0	34.1	10.5	
Progression Factor		1.00						1.00	1.00	1.45	0.87	
Incremental Delay, d2		5.0						3.0	1.2	37.1	0.4	
Delay (s)		32.4						31.1	1.2	86.5	9.5	
Level of Service		C						C	A	F	A	
Approach Delay (s)		32.4			0.0			16.6		40.0		
Approach LOS		C			A			B		D		

Intersection Summary				
HCM Average Control Delay	29.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	250	190	950	0	0	961
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frpb, ped/bikes	0.99	0.97	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	0.97	0.85	1.00			1.00
Flt Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3348	1396	3318			3318
Flt Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3348	1396	3318			3318
Peak-hour factor, PHF	0.81	0.81	0.95	0.95	0.83	0.83
Adj. Flow (vph)	309	235	1000	0	0	1158
RTOR Reduction (vph)	28	72	0	0	0	0
Lane Group Flow (vph)	347	97	1000	0	0	1158
Confl. Peds. (#/hr)		17				
Confl. Bikes (#/hr)		2				
Parking (#/hr)			5			5
Turn Type		Perm				
Protected Phases	4		6			6
Permitted Phases		4				
Actuated Green, G (s)	17.5	17.5	53.5			53.5
Effective Green, g (s)	17.5	17.5	53.5			53.5
Actuated g/C Ratio	0.22	0.22	0.67			0.67
Clearance Time (s)	4.0	4.0	5.0			5.0
Vehicle Extension (s)	2.0	2.0	2.0			2.0
Lane Grp Cap (vph)	732	305	2219			2219
v/s Ratio Prot	c0.10		0.30			c0.35
v/s Ratio Perm		0.07				
v/c Ratio	0.47	0.32	0.45			0.52
Uniform Delay, d1	27.2	26.2	6.3			6.7
Progression Factor	1.00	1.00	0.10			1.00
Incremental Delay, d2	0.2	0.2	0.3			0.9
Delay (s)	27.4	26.5	1.0			7.6
Level of Service	C	C	A			A
Approach Delay (s)	27.1		1.0			7.6
Approach LOS	C		A			A

Intersection Summary				
HCM Average Control Delay	9.1	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	100.4%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: El Embarcadero EB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	950	624	319	892
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0		4.0	4.0
Lane Util. Factor			0.95		1.00	0.95
Frpb, ped/bikes			0.93		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			0.94		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3108		1767	3362
Flt Permitted			1.00		0.15	1.00
Satd. Flow (perm)			3108		275	3362
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.83	0.83
Adj. Flow (vph)	0	0	1000	657	384	1075
RTOR Reduction (vph)	0	0	106	0	0	0
Lane Group Flow (vph)	0	0	1551	0	384	1075
Confl. Peds. (#/hr)	70			88	86	
Confl. Bikes (#/hr)				25		
Parking (#/hr)				5	0	
Turn Type					custom	
Protected Phases			2		1	1 6 7
Permitted Phases					1 4 6 7	
Actuated Green, G (s)			44.5		76.0	68.8
Effective Green, g (s)			44.5		76.0	68.8
Actuated g/C Ratio			0.56		0.95	0.86
Clearance Time (s)			5.0		4.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)			1729		356	2891
v/s Ratio Prot			0.50		c0.07	0.32
v/s Ratio Perm					c0.96	
v/c Ratio			0.90		1.08	0.37
Uniform Delay, d1			15.7		2.9	1.2
Progression Factor			1.00		1.24	0.62
Incremental Delay, d2			7.8		69.1	0.0
Delay (s)			23.5		72.8	0.7
Level of Service			C		E	A
Approach Delay (s)	0.0		23.5		19.7	
Approach LOS	A		C		B	

Intersection Summary				
HCM Average Control Delay	21.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	100.4%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	0	173	377	641	181	213	444	0	0	329	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.66			1.00	0.91	1.00	1.00			0.88	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.94	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	868			3468	1255	1770	3539			2759	
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	868			3468	1255	1770	3539			2759	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	87	0	204	405	562	195	254	529	0	0	370	222
RTOR Reduction (vph)	0	193	0	0	0	85	0	0	0	0	88	0
Lane Group Flow (vph)	78	20	0	0	987	110	254	529	0	0	504	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0			38.3	38.3	17.0	42.1			21.1	
Effective Green, g (s)	5.0	5.0			38.3	38.3	17.0	42.1			21.1	
Actuated g/C Ratio	0.05	0.05			0.40	0.40	0.18	0.43			0.22	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	87	45			1371	496	311	1538			601	
v/s Ratio Prot	c0.05	0.02			c0.28		c0.14	0.15			c0.18	
v/s Ratio Perm						0.09						
v/c Ratio	0.90	0.43			0.72	0.22	0.82	0.34			0.84	
Uniform Delay, d1	45.7	44.6			24.8	19.4	38.5	18.2			36.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	61.8	2.4			3.3	1.0	14.4	0.0			9.5	
Delay (s)	107.5	47.0			28.1	20.4	52.9	18.3			45.8	
Level of Service	F	D			C	C	D	B			D	
Approach Delay (s)		63.2			26.8			29.5			45.8	
Approach LOS		E			C			C			D	

Intersection Summary				
HCM Average Control Delay	35.2	HCM Level of Service		D
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	96.9	Sum of lost time (s)		15.5
Intersection Capacity Utilization	83.3%	ICU Level of Service		E
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	1020	153	0	0	0	0	429	848	435	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.92		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.98						0.90		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1411	4674						2749		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.10	1.00	
Satd. Flow (perm)	1411	4674						2749		180	3539	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	222	1085	163	0	0	0	0	452	893	494	619	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	200	1250	0	0	0	0	0	1338	0	494	619	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1454						1161		309	2084	
v/s Ratio Prot								0.49		c0.20	0.17	
v/s Ratio Perm	0.14	0.27								c0.74		
v/c Ratio	0.46	0.86						1.61dr		1.60	0.30	
Uniform Delay, d1	24.9	29.2						26.0		26.7	9.2	
Progression Factor	1.08	1.04						1.00		1.00	1.00	
Incremental Delay, d2	2.3	4.7						78.8		284.2	0.4	
Delay (s)	29.2	35.1						104.8		310.9	9.6	
Level of Service	C	D						F		F	A	
Approach Delay (s)		34.3			0.0			104.8			143.3	
Approach LOS		C			A			F			F	

Intersection Summary				
HCM Average Control Delay	89.3	HCM Level of Service		F
HCM Volume to Capacity ratio	1.32			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	99.1%	ICU Level of Service		F
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	939	0	0	1005
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3318			3318
Flt Permitted			1.00			1.00
Satd. Flow (perm)			3318			3318
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.95	0.95
Adj. Flow (vph)	0	0	1032	0	0	1058
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1032	0	0	1058
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2800			2800
v/s Ratio Prot			0.31			c0.32
v/s Ratio Perm						
v/c Ratio			0.37			0.38
Uniform Delay, d1			2.1			2.2
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.0
Delay (s)			2.2			2.2
Level of Service			A			A
Approach Delay (s)	0.0		2.2			2.2
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.2	HCM Level of Service		A
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)		18.8
Intersection Capacity Utilization	31.1%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	29	123	671	73	122	769
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.90		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1292		3250		1770	3318
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1292		3250		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	134	947	79	133	836
RTOR Reduction (vph)	117	0	10	0	0	0
Lane Group Flow (vph)	49	0	1016	0	133	836
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.0		18.5		6.1	28.6
Effective Green, g (s)	5.0		18.5		6.1	28.6
Actuated g/C Ratio	0.13		0.47		0.15	0.72
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	163		1518		273	2396
v/s Ratio Prot	c0.04		c0.31		c0.08	0.25
v/s Ratio Perm						
v/c Ratio	0.30		0.67		0.49	0.35
Uniform Delay, d1	15.7		8.2		15.3	2.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.9		0.5	0.0
Delay (s)	16.1		9.1		15.8	2.1
Level of Service	B		A		B	A
Approach Delay (s)	16.1		9.1			4.0
Approach LOS	B		A			A

Intersection Summary				
HCM Average Control Delay	7.3	HCM Level of Service		A
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	39.6	Sum of lost time (s)		10.0
Intersection Capacity Utilization	56.7%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av 5/23/2007

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis
8: El Embarcadero EB & Lakeshore Av 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	379	564	0	895	435	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.92	0.95	0.93	0.93
Hourly flow rate (vph)	421	627	0	942	468	0
Pedestrians				7	8	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				763		
pX, platoon unblocked						
vC, conflicting volume	947	241	468			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	947	241	468			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	17	100			
cM capacity (veh/h)	258	756	1090			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	281	767	471	471	234	234
Volume Left	281	140	0	0	0	0
Volume Right	0	627	0	0	0	0
cSH	258	558	1700	1700	1700	1700
Volume to Capacity	1.09	1.37	0.28	0.28	0.14	0.14
Queue Length 95th (ft)	295	861	0	0	0	0
Control Delay (s)	124.2	200.8	0.0	0.0	0.0	0.0
Lane LOS	F	F				
Approach Delay (s)	180.2		0.0		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	76.8		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	24	939	0	12	1004
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.91	0.91	0.94	0.94
Hourly flow rate (vph)	2	42	1032	0	13	1068
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	1690	549			1061	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1610	399			942	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	92			98	
cM capacity (veh/h)	81	551			665	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	44	688	344	369	712
Volume Left	2	0	0	13	0
Volume Right	42	0	0	0	0
cSH	447	1700	1700	665	1700
Volume to Capacity	0.10	0.40	0.20	0.02	0.42
Queue Length 95th (ft)	8	0	0	1	0
Control Delay (s)	13.9	0.0	0.0	0.6	0.0
Lane LOS	B			A	
Approach Delay (s)	13.9	0.0		0.2	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	4	907	10	20	896
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.50	0.90	0.90	0.88	0.88
Hourly flow rate (vph)	10	8	1008	11	23	1018
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.86	0.85			0.85	
vC, conflicting volume	1585	522			1030	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1290	87			684	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			97	
cM capacity (veh/h)	127	802			763	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	18	672	347	23	509	509
Volume Left	10	0	0	23	0	0
Volume Right	8	0	11	0	0	0
cSH	203	1700	1700	763	1700	1700
Volume to Capacity	0.09	0.40	0.20	0.03	0.30	0.30
Queue Length 95th (ft)	7	0	0	2	0	0
Control Delay (s)	24.5	0.0	0.0	9.9	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	24.5	0.0		0.2		
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	29	61	890	92	129	779
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.97		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1412		3252		1770	3318
Flt Permitted	0.98		1.00		0.15	1.00
Satd. Flow (perm)	1412		3252		287	3318
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91
Adj. Flow (vph)	32	68	957	99	142	856
RTOR Reduction (vph)	43	0	13	0	0	0
Lane Group Flow (vph)	57	0	1043	0	142	856
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					pm+pt	
Protected Phases	7		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	22.0		22.0		31.0	31.0
Effective Green, g (s)	22.0		22.0		31.0	31.0
Actuated g/C Ratio	0.37		0.37		0.52	0.52
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	518		1192		272	1714
v/s Ratio Prot	c0.04		c0.32		0.04	c0.26
v/s Ratio Perm					0.23	
v/c Ratio	0.11		0.87		0.52	0.50
Uniform Delay, d1	12.5		17.7		10.8	9.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		9.1		7.0	1.0
Delay (s)	13.0		26.8		17.8	10.5
Level of Service	B		C		B	B
Approach Delay (s)	13.0		26.8			11.5
Approach LOS	B		C			B

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	267	183	759	521	339	505
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		0.91	0.91	1.00	0.95
Frpb, ped/bikes	0.96		0.99	0.94	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.94		0.98	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3161		3280	1347	1770	3318
Flt Permitted	0.97		1.00	1.00	0.95	1.00
Satd. Flow (perm)	3161		3280	1347	1770	3318
Peak-hour factor, PHF	0.90	0.90	0.88	0.88	0.91	0.91
Adj. Flow (vph)	319	203	862	592	373	555
RTOR Reduction (vph)	137	0	17	296	0	0
Lane Group Flow (vph)	385	0	999	142	373	555
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)					5	
Turn Type				Perm	Prot	
Protected Phases	4		2		1	
Permitted Phases				2		6
Actuated Green, G (s)	26.0		26.0	26.0	19.0	48.0
Effective Green, g (s)	26.0		26.0	26.0	19.0	48.0
Actuated g/C Ratio	0.32		0.32	0.32	0.24	0.60
Clearance Time (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1027		1066	438	420	1991
v/s Ratio Prot	c0.12		c0.30		c0.21	
v/s Ratio Perm				0.11		0.17
v/c Ratio	0.37		0.94	0.33	0.89	0.28
Uniform Delay, d1	20.8		26.2	20.4	29.5	7.7
Progression Factor	1.00		1.59	7.55	1.00	1.00
Incremental Delay, d2	1.0		15.4	1.9	23.3	0.3
Delay (s)	21.8		57.1	155.7	52.7	8.0
Level of Service	C		E	F	D	A
Approach Delay (s)	21.8		86.8			26.0
Approach LOS	C		F			C

Intersection Summary			
HCM Average Control Delay	55.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Lakeshore Av & Foothill Blvd #2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	199	113	0	1116	0	0	0	606
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5			3.0				3.0
Lane Util. Factor					0.95			0.91				*0.91
Frpb, ped/bikes					0.98			1.00				1.00
Flpb, ped/bikes					1.00			1.00				1.00
Frt					0.95			1.00				1.00
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					3039			4690				4893
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					3039			4690				4893
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	214	122	0	1202	0	0	0	876
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	0	350
Lane Group Flow (vph)	0	0	0	0	284	0	0	1202	0	0	0	526
Confl. Peds. (#/hr)						42						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	6%	2%	2%	2%	6%
Parking (#/hr)		0			5			5				
Turn Type												custom
Protected Phases					2			1				
Permitted Phases												1
Actuated Green, G (s)					25.5			48.0				48.0
Effective Green, g (s)					25.5			48.0				48.0
Actuated g/C Ratio					0.32			0.60				0.60
Clearance Time (s)					3.5			3.0				3.0
Lane Grp Cap (vph)					969			2814				2936
v/s Ratio Prot					c0.09			c0.26				
v/s Ratio Perm												0.11
v/c Ratio					0.29			0.43				0.18
Uniform Delay, d1					20.5			8.6				7.2
Progression Factor					1.00			1.43				7.10
Incremental Delay, d2					0.8			0.2				0.1
Delay (s)					21.2			12.6				51.0
Level of Service					C			B				D
Approach Delay (s)		0.0			21.2			12.6			51.0	
Approach LOS		A			C			B			D	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	232	57	0	0	0	0	1138	219	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.5				
Lane Util. Factor		0.95						0.95				
Frpb, ped/bikes		0.97						1.00				
Flpb, ped/bikes		1.00						1.00				
Frt		0.97						0.98				
Flt Protected		1.00						1.00				
Satd. Flow (prot)		3144						3110				
Flt Permitted		1.00						1.00				
Satd. Flow (perm)		3144						3110				
Peak-hour factor, PHF	0.87	0.87	0.87	0.92	0.92	0.92	0.86	0.86	0.86	0.92	0.92	0.92
Adj. Flow (vph)	0	267	66	0	0	0	0	1323	255	0	0	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	306	0	0	0	0	0	1558	0	0	0	0
Confl. Peds. (#/hr)			70						26			
Confl. Bikes (#/hr)			16						9			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	4%	2%	2%	2%
Parking (#/hr)		0			0			5			0	
Turn Type												
Protected Phases		2						1				
Permitted Phases												
Actuated Green, G (s)		27.0						46.0				
Effective Green, g (s)		27.0						46.0				
Actuated g/C Ratio		0.34						0.57				
Clearance Time (s)		3.5						3.5				
Lane Grp Cap (vph)		1061						1788				
v/s Ratio Prot		c0.10						c0.50				
v/s Ratio Perm												
v/c Ratio		0.29						0.87				
Uniform Delay, d1		19.4						14.5				
Progression Factor		1.07						1.00				
Incremental Delay, d2		0.7						6.2				
Delay (s)		21.6						20.6				
Level of Service		C						C				
Approach Delay (s)		21.6			0.0			20.6			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	22	1132	11	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	1230	12	0	0
Pedestrians	70					70
Lane Width (ft)	12.0					0.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			219			149
pX, platoon unblocked						
vC, conflicting volume	1306	556			1312	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1306	556			1312	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	143	447			492	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3
Volume Total	24	492	492	258
Volume Left	0	0	0	0
Volume Right	24	0	0	12
cSH	447	1700	1700	1700
Volume to Capacity	0.05	0.29	0.29	0.15
Queue Length 95th (ft)	4	0	0	0
Control Delay (s)	13.5	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.5	0.0		
Approach LOS	B			

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	41.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	25	249	12	53	131	0	0	16	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	28	283	14	60	149	0	0	20	35
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	298			15			294	369	15	422	363	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298			15			294	369	15	422	363	184
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	72	100	100	96	96
cM capacity (veh/h)	1260			1581			570	541	1047	397	546	826

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	170	155	209	56
Volume Left	28	0	60	0
Volume Right	0	14	0	35
cSH	1581	1700	549	696
Volume to Capacity	0.02	0.09	0.38	0.08
Queue Length 95th (ft)	1	0	44	7
Control Delay (s)	1.3	0.0	15.5	10.6
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.5	10.6
Approach LOS			C	B

Intersection Summary				
Average Delay	6.9			
Intersection Capacity Utilization	31.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	401	30	0	0	0	0	207	12	7	32	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	31	441	33	0	0	0	0	262	15	9	40	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	4			480			544	529	248	437	545	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			275			345	328	25	229	346	4
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	51	98	98	92	100
cM capacity (veh/h)	1611			1182			496	530	962	384	518	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	251	253	277	48
Volume Left	31	0	0	9
Volume Right	0	33	15	0
cSH	1611	1700	543	488
Volume to Capacity	0.02	0.15	0.51	0.10
Queue Length 95th (ft)	1	0	72	8
Control Delay (s)	1.0	0.0	18.3	13.2
Lane LOS	A		C	B
Approach Delay (s)	0.5		18.3	13.2
Approach LOS			C	B

Intersection Summary				
Average Delay	7.2			
Intersection Capacity Utilization	31.6%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	48	268	188	36	40	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	291	204	39	43	35
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	313				760	384
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				760	364
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	94
cM capacity (veh/h)	1174				317	604

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	343	243	78
Volume Left	52	0	43
Volume Right	0	39	35
cSH	1174	1700	402
Volume to Capacity	0.04	0.14	0.19
Queue Length 95th (ft)	3	0	18
Control Delay (s)	1.6	0.0	16.1
Lane LOS	A		C
Approach Delay (s)	1.6	0.0	16.1
Approach LOS			C

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	52.7%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	267	71	1261	572	0	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.5	4.0		3.5
Lane Util. Factor	0.97		0.91	0.91		1.00
Frpb, ped/bikes	0.97		1.00	0.98		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		0.99	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3224		3239	1382		1568
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3224		3239	1382		1568
Peak-hour factor, PHF	0.90	0.90	0.91	0.91	0.60	0.60
Adj. Flow (vph)	297	79	1386	629	0	97
RTOR Reduction (vph)	9	0	3	0	0	0
Lane Group Flow (vph)	367	0	1446	566	0	97
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				5
Turn Type				Free		
Protected Phases	2					
Permitted Phases			1	Free		1
Actuated Green, G (s)	45.0		45.0	97.0		45.0
Effective Green, g (s)	45.0		45.0	97.0		45.0
Actuated g/C Ratio	0.46		0.46	1.00		0.46
Clearance Time (s)	3.5		3.5			3.5
Lane Grp Cap (vph)	1496		1503	1382		727
v/s Ratio Prot	0.11					
v/s Ratio Perm			c0.45	c0.41		0.06
v/c Ratio	0.25		0.96	0.41		0.13
Uniform Delay, d1	15.7		25.2	0.0		14.9
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.4		15.8	0.9		0.4
Delay (s)	16.1		40.9	0.9		15.2
Level of Service	B		D	A		B
Approach Delay (s)	16.1		29.7			15.2
Approach LOS	B		C			B

Intersection Summary				
HCM Average Control Delay	27.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	3.5	
Intersection Capacity Utilization	72.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	432	56	47	134	6	145	237	56	6	34	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.97			1.00	
Frt		0.98			0.99			0.98			0.94	
Flt Protected		0.99			0.99			0.98			1.00	
Satd. Flow (prot)		3155			3183			1511			1445	
Flt Permitted		0.88			0.73			0.87			0.97	
Satd. Flow (perm)		2802			2363			1338			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	470	61	51	146	9	158	258	61	7	37	36
RTOR Reduction (vph)	0	24	0	0	6	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	584	0	0	200	0	0	474	0	0	67	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		23.6			23.6			50.4			50.4	
Effective Green, g (s)		23.6			23.6			50.4			50.4	
Actuated g/C Ratio		0.30			0.30			0.63			0.63	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		827			697			843			888	
v/s Ratio Prot												
v/s Ratio Perm		c0.21			0.08			c0.35			0.05	
v/c Ratio		0.71			0.29			0.56			0.08	
Uniform Delay, d1		25.1			21.7			8.5			5.7	
Progression Factor		1.00			1.00			1.00			0.85	
Incremental Delay, d2		2.3			0.1			2.7			0.2	
Delay (s)		27.4			21.8			11.2			5.0	
Level of Service		C			C			B			A	
Approach Delay (s)		27.4			21.8			11.2			5.0	
Approach LOS		C			C			B			A	

Intersection Summary				
HCM Average Control Delay	19.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	108.2%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007

Movement	WBL2	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2	NEL	NER
Lane Configurations												
Volume (vph)	20	131	0	67	6	62	8	106	61	20	374	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Util. Factor		0.95	1.00			1.00			1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	0.90			0.99			1.00	0.92	1.00	1.00
Flpb, ped/bikes		0.99	1.00			0.99			0.96	1.00	0.95	1.00
Frt		1.00	0.85			0.99			1.00	0.85	0.95	1.00
Flt Protected		0.99	1.00			1.00			0.97	1.00	0.97	1.00
Satd. Flow (prot)		3481	1243			1573			1739	1268	1627	1770
Flt Permitted		0.99	1.00			0.98			0.76	1.00	0.97	1.00
Satd. Flow (perm)		3481	1243			1541			1360	1268	1627	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	142	0	73	7	67	9	115	66	22	407	815
RTOR Reduction (vph)	0	0	36	0	0	6	0	0	0	0	0	0
Lane Group Flow (vph)	0	164	37	0	0	77	0	0	161	22	635	587
Confl. Peds. (#/hr)	70			70	70		70	70		70	70	
Confl. Bikes (#/hr)				16			16			16		
Parking (#/hr)			5			5				5		
Turn Type	Perm		Perm		Perm			Perm		Perm		custom
Protected Phases		1				2			2			
Permitted Phases	1		1		2			2		2	1	1
Actuated Green, G (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Effective Green, g (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Actuated g/C Ratio		0.51	0.51			0.35			0.35	0.35	0.51	0.51
Clearance Time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Grp Cap (vph)		1767	631			545			481	449	826	899
v/s Ratio Prot												
v/s Ratio Perm		0.05	0.03			0.05			c0.13	0.02	c0.39	0.33
v/c Ratio		0.09	0.06			0.14			0.38	0.05	0.77	0.65
Uniform Delay, d1		8.3	8.1			14.3			15.7	13.8	12.9	11.8
Progression Factor		2.07	1.00			1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.2			0.5			2.2	0.2	6.8	3.7
Delay (s)		17.2	8.3			14.8			17.9	14.0	19.7	15.5
Level of Service		B	A			B			B	B	B	B
Approach Delay (s)		14.5				14.8			17.5		17.6	
Approach LOS		B				B			B		B	

Intersection Summary				
HCM Average Control Delay	17.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	93.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007

Movement	NER2
Lane Configurations	
Volume (vph)	10
Ideal Flow (vphpl)	1900
Total Lost time (s)	3.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.90
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1421
Flt Permitted	1.00
Satd. Flow (perm)	1421
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	11
Confl. Peds. (#/hr)	70
Confl. Bikes (#/hr)	16
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	1
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.51
Clearance Time (s)	3.0
Lane Grp Cap (vph)	721
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.02
Uniform Delay, d1	7.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	8.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	46	278	44	38	261	0	0	134	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3202			1652			1642	
Flt Permitted					0.99			0.95			1.00	
Satd. Flow (perm)					3202			1587			1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	50	302	48	41	284	0	0	146	14
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	384	0	0	325	0	0	155	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1330			769			796	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.12			c0.20				
v/c Ratio					0.29			0.42			0.19	
Uniform Delay, d1					12.6			10.9			9.5	
Progression Factor					1.00			1.27			1.00	
Incremental Delay, d2					0.5			1.5			0.5	
Delay (s)					13.2			15.3			10.1	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.2			15.3			10.1	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	62.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	436	36	28	483	46	63	227	45	37	189	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3288			3277			1607			1636	
Flt Permitted		0.93			0.92			0.90			0.91	
Satd. Flow (perm)		3049			3017			1454			1502	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	474	39	30	525	50	68	247	49	40	205	17
RTOR Reduction (vph)	0	9	0	0	10	0	0	9	0	0	4	0
Lane Group Flow (vph)	0	526	0	0	595	0	0	355	0	0	258	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1384			1369			626			647	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.20			c0.24			0.17	
v/c Ratio		0.38			0.43			0.57			0.40	
Uniform Delay, d1		11.7			12.1			13.9			12.7	
Progression Factor		1.00			1.00			0.94			0.79	
Incremental Delay, d2		0.8			1.0			2.6			1.8	
Delay (s)		12.5			13.1			15.6			11.8	
Level of Service		B			B			B			B	
Approach Delay (s)		12.5			13.1			15.6			11.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	67.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	589	71	25	371	63	54	287	99	46	180	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3267			3236			1582			1618	
Flt Permitted		0.93			0.90			0.93			0.88	
Satd. Flow (perm)		3051			2932			1483			1434	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	640	77	27	403	68	59	312	108	50	196	30
RTOR Reduction (vph)	0	14	0	0	19	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	728	0	0	479	0	0	463	0	0	269	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1549			1489			570			552	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.16			c0.31			0.19	
v/c Ratio		0.47			0.32			0.81			0.49	
Uniform Delay, d1		10.3			9.4			17.9			15.1	
Progression Factor		1.47			1.00			0.80			0.72	
Incremental Delay, d2		0.8			0.6			10.7			2.9	
Delay (s)		16.0			10.0			25.1			13.8	
Level of Service		B			A			C			B	
Approach Delay (s)		16.0			10.0			25.1			13.8	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	16.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	73.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	681	143	35	211	26	55	303	61	34	231	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.91		0.98	
Flpb, ped/bikes	0.94	1.00		0.98	1.00			0.99	1.00		1.00	
Frt	1.00	0.97		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1661	4690		1729	4773			1655	1448		1596	
Flt Permitted	0.59	1.00		0.25	1.00			0.91	1.00		0.94	
Satd. Flow (perm)	1025	4690		463	4773			1511	1448		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	740	155	38	229	28	60	329	66	37	251	64
RTOR Reduction (vph)	0	50	0	0	16	0	0	0	36	0	12	0
Lane Group Flow (vph)	192	845	0	38	241	0	0	389	30	0	340	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	442	2020		199	2056			697	668		696	
v/s Ratio Prot		0.18			0.05							
v/s Ratio Perm	c0.19			0.08				c0.26	0.02		0.23	
v/c Ratio	0.43	0.42		0.19	0.12			0.56	0.05		0.49	
Uniform Delay, d1	13.0	12.8		11.5	11.1			12.7	9.6		12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.66	
Incremental Delay, d2	3.1	0.6		2.1	0.1			3.2	0.1		2.3	
Delay (s)	16.0	13.5		13.6	11.2			15.9	9.8		10.3	
Level of Service	B	B		B	B			B	A		B	
Approach Delay (s)		13.9			11.5			15.0			10.3	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

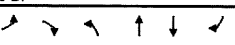
HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	430	2	2	184	381	1	2	1	314	2	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	467	2	2	200	414	1	2	1	341	2	49

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	513	202	414	4	343	49
Volume Left (vph)	43	2	0	1	341	0
Volume Right (vph)	2	0	414	1	0	49
Hadj (s)	0.05	0.04	-0.67	-0.07	0.53	-0.67
Departure Headway (s)	7.0	7.2	6.5	9.3	8.1	6.9
Degree Utilization, x	1.00	0.41	0.75	0.01	0.77	0.09
Capacity (veh/h)	506	499	552	353	343	513
Control Delay (s)	67.4	13.9	25.0	12.4	32.7	9.4
Approach Delay (s)	67.4	21.4		12.4	29.8	
Approach LOS	F	C		B	D	

Intersection Summary				
Delay	39.0			
HCM Level of Service	E			
Intersection Capacity Utilization	75.9%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007

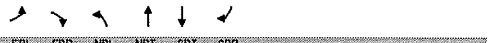


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	67	0	0	807	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	116	0	0	887	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	366	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	100	100			
cM capacity (veh/h)	607	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3
Volume Total	58	58	296	296	296
Volume Left	58	58	0	0	0
Volume Right	0	0	0	0	0
cSH	607	607	1700	1700	1700
Volume to Capacity	0.10	0.10	0.17	0.17	0.17
Queue Length 95th (ft)	8	8	0	0	0
Control Delay (s)	11.6	11.6	0.0	0.0	0.0
Lane LOS	B	B			
Approach Delay (s)	11.6		0.0		
Approach LOS	B				

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	0	0	813	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	84	0	0	856	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	284	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	87	100	100			
cM capacity (veh/h)	672	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	84	214	214	214	214
Volume Left	84	0	0	0	0
Volume Right	0	0	0	0	0
cSH	672	1700	1700	1700	1700
Volume to Capacity	0.13	0.13	0.13	0.13	0.13
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	21.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	9	222	1056	57	144	446	49	75	179	304	141	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.91		
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.95		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3283		1757	3054			1544	2754		
Flt Permitted		0.95	1.00		0.23	1.00			0.54	0.93		
Satd. Flow (perm)		3433	3283		430	3054			872	2576		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	241	1148	62	157	485	53	82	195	330	153	17
RTOR Reduction (vph)	0	0	4	0	0	13	0	0	0	3	0	0
Lane Group Flow (vph)	0	251	1206	0	157	607	0	0	175	517	0	0
Confl. Peds. (#/hr)		70		70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Perm				Perm			
Protected Phases	5	5	2			6				4		
Permitted Phases					6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		725	1860		129	916			281	830		
v/s Ratio Prot		0.07	c0.37			0.20						
v/s Ratio Perm					c0.37				0.20	c0.20		
v/c Ratio		0.35	0.65		1.22	0.66			0.62	0.62		
Uniform Delay, d1		30.2	13.4		31.5	27.5			25.9	25.9		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		1.3	1.8		149.0	3.8			10.0	3.5		
Delay (s)		31.5	15.1		180.5	31.3			35.8	29.4		
Level of Service		C	B		F	C			D	C		
Approach Delay (s)			17.9			61.4				31.0		
Approach LOS			B			E				C		

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	35	16	125	116
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.98	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3136	
Flt Permitted			0.77	
Satd. Flow (perm)			2438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	16	136	126
RTOR Reduction (vph)	0	0	35	0
Lane Group Flow (vph)	0	0	281	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			786	
v/s Ratio Prot				
v/s Ratio Perm			0.12	
v/c Ratio			0.36	
Uniform Delay, d1			23.4	
Progression Factor			1.00	
Incremental Delay, d2			1.3	
Delay (s)			24.6	
Level of Service			C	
Approach Delay (s)			24.6	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	474	149	246	330	30	0	1248	724	0	575	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3280		3400	3440			5036	1479		4696	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3280		3400	3440			5036	1479		4696	
Peak-hour factor, PHF	0.85	0.85	0.85	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88
Adj. Flow (vph)	152	558	175	293	393	36	0	1342	778	0	653	88
RTOR Reduction (vph)	0	34	0	0	7	0	0	0	388	0	18	0
Lane Group Flow (vph)	152	699	0	293	422	0	0	1342	390	0	723	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Effective Green, g (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.09	0.26		0.27	0.45			0.29	0.29		0.29	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	323	858		932	1558			1483	435		1383	
v/s Ratio Prot	0.04	c0.21		c0.09	0.12			c0.27			0.15	
v/s Ratio Perm									0.26			
v/c Ratio	0.47	0.81		0.31	0.27			0.90	0.90		0.52	
Uniform Delay, d1	37.9	30.6		25.5	15.1			30.0	29.9		26.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	5.7		0.1	0.4			8.0	20.1		0.2	
Delay (s)	38.3	36.3		25.5	15.5			37.9	49.9		26.1	
Level of Service	D	D		C	B			D	D		C	
Approach Delay (s)		36.6			19.6			42.3			26.1	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
32: Harrison St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations								
Volume (vph)	921	0	0	850	0	652	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0		4.0		
Lane Util. Factor	0.94			0.91		*0.95		
Frt	1.00			1.00		1.00		
Flt Protected	0.95			1.00		1.00		
Satd. Flow (prot)	4802			4916		3539		
Flt Permitted	0.95			1.00		1.00		
Satd. Flow (perm)	4802			4916		3539		
Peak-hour factor, PHF	0.90	0.90	0.92	0.90	0.92	0.91	0.92	0.92
Adj. Flow (vph)	1023	0	0	944	0	716	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1023	0	0	944	0	716	0	0
Heavy Vehicles (%)	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)				0	0			
Turn Type						custom		
Protected Phases	2			1		1		
Permitted Phases								
Actuated Green, G (s)	33.0			38.0		38.0		
Effective Green, g (s)	33.0			38.0		38.0		
Actuated g/C Ratio	0.41			0.48		0.48		
Clearance Time (s)	5.0			4.0		4.0		
Lane Grp Cap (vph)	1981			2335		1681		
v/s Ratio Prot	c0.21			0.19		c0.20		
v/s Ratio Perm								
v/c Ratio	0.52			0.40		0.43		
Uniform Delay, d1	17.5			13.6		13.8		
Progression Factor	0.76			1.00		0.68		
Incremental Delay, d2	0.7			0.5		0.7		
Delay (s)	14.0			14.2		10.2		
Level of Service	B			B		B		
Approach Delay (s)	14.0			14.2	10.2		0.0	
Approach LOS	B			B	B		A	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	EBT	EBR	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	NBR2	SBR
Lane Configurations												
Volume (vph)	271	142	37	124	222	83	119	33	0	650	28	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	0.91	*0.95		0.91	0.91	1.00			0.95	0.95		1.00
Frpb, ped/bikes	1.00	0.88		1.00	1.00	1.00			1.00	0.91		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00
Frt	0.98	1.00		1.00	1.00	0.85			0.90	1.00		0.86
Flt Protected	1.00	1.00		0.95	1.00	1.00			0.98	1.00		1.00
Satd. Flow (prot)	3204	1340		1610	3260	1583			1571	1410		1611
Flt Permitted	1.00	1.00		0.95	0.95	1.00			0.98	1.00		1.00
Satd. Flow (perm)	3204	1340		1610	3117	1583			1571	1410		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	295	154	40	135	241	90	129	36	0	707	30	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	341	148	0	121	255	90	0	0	462	440	0	33
Confl. Peds. (#/hr)			70				70				70	
Confl. Bikes (#/hr)			16								16	
Heavy Vehicles (%)	6%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5								5	
Turn Type		Perm			Prot		Perm	Perm	Split		Perm	custom
Protected Phases	1			2	6				8	8		5
Permitted Phases		1				6	8				8	
Actuated Green, G (s)	18.0	18.0		10.0	20.0	20.0			29.0	29.0		8.0
Effective Green, g (s)	18.0	18.0		10.0	20.0	20.0			29.0	29.0		8.0
Actuated g/C Ratio	0.22	0.22		0.12	0.25	0.25			0.36	0.36		0.10
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Grp Cap (vph)	721	302		201	797	396			568	511		161
v/s Ratio Prot	0.11			c0.08	0.04				0.29			0.02
v/s Ratio Perm		c0.11			0.04	0.06				c0.31		
v/c Ratio	0.47	0.49		0.60	0.32	0.23			0.81	0.86		0.20
Uniform Delay, d1	26.9	27.0		33.1	24.5	23.9			23.0	23.6		33.1
Progression Factor	1.00	1.00		1.14	1.16	1.15			1.00	1.00		1.00
Incremental Delay, d2	2.2	5.6		12.1	1.0	1.3			12.0	17.1		2.9
Delay (s)	29.1	32.6		49.8	29.4	28.7			35.0	40.8		35.9
Level of Service	C	C		D	C	C			D	D		D
Approach Delay (s)	30.2				34.6				37.8			
Approach LOS	C				C				D			

Intersection Summary				
HCM Average Control Delay	34.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	62.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	SER2	NWL2	NWL	NWT
Lane Configurations				
Volume (vph)	10	12	78	10
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00
Frt	0.86	1.00	1.00	1.00
Flt Protected	1.00	0.95	0.95	0.96
Satd. Flow (prot)	1611	1770	1649	1679
Flt Permitted	1.00	0.95	0.95	0.96
Satd. Flow (perm)	1611	1770	1649	1679
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	13	85	11
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	11	13	48	48
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				16
Heavy Vehicles (%)	2%	2%	4%	2%
Parking (#/hr)				
Turn Type	Free	Split	Split	
Protected Phases		7	7	
Permitted Phases	Free			
Actuated Green, G (s)	80.0	7.0	7.0	7.0
Effective Green, g (s)	80.0	7.0	7.0	7.0
Actuated g/C Ratio	1.00	0.09	0.09	0.09
Clearance Time (s)		4.0	4.0	4.0
Lane Grp Cap (vph)	1611	155	144	147
v/s Ratio Prot		0.01	c0.03	0.03
v/s Ratio Perm	0.01			
v/c Ratio	0.01	0.08	0.33	0.33
Uniform Delay, d1	0.0	33.6	34.3	34.3
Progression Factor	1.00	0.76	0.77	0.77
Incremental Delay, d2	0.0	1.1	6.1	5.8
Delay (s)	0.0	26.5	32.5	32.2
Level of Service	A	C	C	C
Approach Delay (s)				31.6
Approach LOS				C

Intersection Summary

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	224	7	3	650	630	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1518			3317	3158	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1518			3160	3158	
Peak-hour factor, PHF	0.75	0.75	0.91	0.91	0.95	0.95
Adj. Flow (vph)	299	9	3	714	663	173
RTOR Reduction (vph)	3	0	0	0	52	0
Lane Group Flow (vph)	305	0	0	717	784	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4			2	6	
Permitted Phases			2	2		
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	540			1545	1544	
v/s Ratio Prot	c0.20				c0.25	
v/s Ratio Perm				0.23		
v/c Ratio	0.57			0.46	0.51	
Uniform Delay, d1	11.7			7.6	7.8	
Progression Factor	1.00			0.63	1.00	
Incremental Delay, d2	4.2			1.0	1.2	
Delay (s)	15.9			5.8	9.0	
Level of Service	B			A	A	
Approach Delay (s)	15.9			5.8	9.0	
Approach LOS	B			A	A	

Intersection Summary				
HCM Average Control Delay	8.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	42.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & Madison St 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	591	11	0	0	0	0	106	660	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		3318						3318	3318		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		3318						3318	3318		
Peak-hour factor, PHF	0.92	0.84	0.84	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	704	13	0	0	0	0	113	702	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	717	0	0	0	0	0	113	702	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		1253						1585	3060		
v/s Ratio Prot		c0.22						0.03			
v/s Ratio Perm									c0.21		
v/c Ratio		0.57						0.07	0.23		
Uniform Delay, d1		11.1						6.4	0.2		
Progression Factor		1.87						1.00	1.00		
Incremental Delay, d2		1.7						0.1	0.2		
Delay (s)		22.4						6.5	0.3		
Level of Service		C						A	A		
Approach Delay (s)	22.4				0.0			1.2		0.0	
Approach LOS	C				A			A		A	

Intersection Summary				
HCM Average Control Delay	11.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑									↑↑↑	
Volume (vph)	0	42	197	0	0	0	0	0	0	45	690	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2737									4814	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2737									4814	
Peak-hour factor, PHF	0.79	0.79	0.79	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	53	249	0	0	0	0	0	0	53	812	0
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	202	0	0	0	0	0	0	0	0	849	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			6									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		882									2567	
v/s Ratio Prot		c0.07										
v/s Ratio Perm											0.18	
v/c Ratio		0.23									0.33	
Uniform Delay, d1		11.2									5.9	
Progression Factor		1.00									2.35	
Incremental Delay, d2		0.6									0.3	
Delay (s)		11.8									14.3	
Level of Service		B									B	
Approach Delay (s)		11.8			0.0			0.0			14.3	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	13.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.29			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	35.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑					↰	↑↑	
Volume (vph)	0	492	58	28	402	0	0	0	0	309	461	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.99	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3124			3241					1295	3103	
Flt Permitted		1.00			0.91					0.95	1.00	
Satd. Flow (perm)		3124			2944					1295	3103	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	553	65	34	484	0	0	0	0	336	501	35
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	598	0	0	518	0	0	0	0	286	576	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type			Perm							Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1458			1374					489	1172	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.18					c0.22	0.19	
v/c Ratio		0.41			0.38					0.58	0.49	
Uniform Delay, d1		7.9			7.8					11.2	10.7	
Progression Factor		1.00			1.19					1.75	1.81	
Incremental Delay, d2		0.9			0.8					4.9	1.4	
Delay (s)		8.8			10.0					24.4	20.8	
Level of Service		A			A					C	C	
Approach Delay (s)		8.8			10.0			0.0			22.0	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	14.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑↑↑				
Volume (vph)	78	749	0	0	280	313	106	406	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			3.5				
Lane Util. Factor		0.95			0.95			0.86				
Frpb, ped/bikes		1.00			0.96			1.00				
Flpb, ped/bikes		1.00			1.00			0.98				
Frt		1.00			0.92			1.00				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3162			3087			5967				
Flt Permitted		0.83			1.00			0.99				
Satd. Flow (perm)		2639			3087			5967				
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	85	814	0	0	318	356	120	461	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	78	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	899	0	0	596	0	0	589	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm						Perm					
Protected Phases		1			1			2				
Permitted Phases	1						2					
Actuated Green, G (s)		19.5			19.5			17.0				
Effective Green, g (s)		19.5			19.5			17.0				
Actuated g/C Ratio		0.43			0.43			0.38				
Clearance Time (s)		5.0			5.0			3.5				
Lane Grp Cap (vph)		1144			1338			2254				
v/s Ratio Prot					0.19							
v/s Ratio Perm		c0.34						0.10				
v/c Ratio		0.79			0.45			0.26				
Uniform Delay, d1		11.0			9.0			9.7				
Progression Factor		0.93			1.00			0.53				
Incremental Delay, d2		4.9			1.1			0.3				
Delay (s)		15.1			10.0			5.4				
Level of Service		B			B			A				
Approach Delay (s)		15.1			10.0			5.4			0.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	10.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	614	162	0	0	0	0	0	0	96	620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5883									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5883									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	667	176	0	0	0	0	0	0	104	674	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	788	0	0	0	0	0	0	0	0	732	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2745									1798	
v/s Ratio Prot		c0.13										
v/s Ratio Perm											0.15	
v/c Ratio		0.29									0.41	
Uniform Delay, d1		7.4									10.3	
Progression Factor		1.00									1.55	
Incremental Delay, d2		0.3									0.6	
Delay (s)		7.7									16.6	
Level of Service		A									B	
Approach Delay (s)		7.7			0.0			0.0			16.6	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	12.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	34.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	608	0	0	0	0	0	465	291	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0				
Lane Util. Factor	1.00	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.97				
Flpb, ped/bikes	0.97	1.00						1.00				
Frt	1.00	1.00						0.94				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	1508	4873						5656				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	1508	4873						5656				
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	81	707	0	0	0	0	0	505	316	0	0	0
RTOR Reduction (vph)	44	0	0	0	0	0	0	85	0	0	0	0
Lane Group Flow (vph)	37	707	0	0	0	0	0	736	0	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm											
Protected Phases		2						1				
Permitted Phases	2											
Actuated Green, G (s)	20.5	20.5						18.0				
Effective Green, g (s)	20.5	20.5						18.0				
Actuated g/C Ratio	0.46	0.46						0.40				
Clearance Time (s)	3.5	3.5						3.0				
Lane Grp Cap (vph)	687	2220						2262				
v/s Ratio Prot		c0.15						c0.13				
v/s Ratio Perm	0.02											
v/c Ratio	0.05	0.32						0.33				
Uniform Delay, d1	6.8	7.8						9.3				
Progression Factor	0.83	0.82						2.75				
Incremental Delay, d2	0.1	0.4						0.4				
Delay (s)	5.8	6.8						26.0				
Level of Service	A	A						C				
Approach Delay (s)		6.7			0.0			26.0			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	16.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	234	719	0	0	0	0	0	550	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5899						4735	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5899						4735	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	257	790	0	0	0	0	0	618	58
RTOR Reduction (vph)	0	0	0	0	67	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	0	0	0	980	0	0	0	0	0	652	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1789	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.17							
v/c Ratio					0.36						0.36	
Uniform Delay, d1					7.7						10.1	
Progression Factor					0.26						1.72	
Incremental Delay, d2					0.3						0.5	
Delay (s)					2.3						18.0	
Level of Service					A						B	
Approach Delay (s)		0.0			2.3			0.0			18.0	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	8.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	33.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	878	23	155	748	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					1.00			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5986			6032				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5966			6032				
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	976	26	167	804	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	30	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	994	0	0	941	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					2519			2346				
v/s Ratio Prot					c0.17							
v/s Ratio Perm								c0.16				
v/c Ratio					0.39			0.40				
Uniform Delay, d1					9.0			10.0				
Progression Factor					1.00			1.72				
Incremental Delay, d2					0.5			0.5				
Delay (s)					9.5			17.6				
Level of Service					A			B				
Approach Delay (s)		0.0			9.5			17.6			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	34.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St 5/23/2007

Movement	SBL	SBT	SER	SET	SER
Lane Configurations					
Volume (vph)	52	774	42	958	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.98	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4796	1548	4580	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4796	1548	4580	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	57	841	46	1041	146
RTOR Reduction (vph)	0	0	0	33	0
Lane Group Flow (vph)	0	898	46	1154	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1832	
v/s Ratio Prot			0.03	c0.25	
v/s Ratio Perm		0.19			
v/c Ratio		0.50	0.07	0.63	
Uniform Delay, d1		10.7	8.3	10.8	
Progression Factor		1.02	1.00	1.00	
Incremental Delay, d2		0.9	0.2	1.7	
Delay (s)		11.9	8.6	12.5	
Level of Service		B	A	B	
Approach Delay (s)		11.9		12.3	
Approach LOS		B		B	

Intersection Summary				
HCM Average Control Delay	12.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	46.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↑	
Volume (vph)	0	0	0	86	192	0	0	0	0	86	802	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	93	209	0	0	0	0	93	872	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	302	0	0	0	0	0	1010	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.10						0.21	
v/c Ratio					0.27						0.42	
Uniform Delay, d1					10.3						6.8	
Progression Factor					1.03						0.30	
Incremental Delay, d2					0.5						0.5	
Delay (s)					11.1						2.6	
Level of Service					B						A	
Approach Delay (s)		0.0			11.1			0.0			2.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↱			↰↑↑↑				
Volume (vph)	2	60	0	0	208	100	86	734	74	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.97			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.99				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		3310			1516			6006				
Flt Permitted		0.95			1.00			1.00				
Satd. Flow (perm)		3138			1516			6006				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	65	0	0	226	109	96	798	80	0	0	0
RTOR Reduction (vph)	0	0	0	0	39	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	67	0	0	296	0	0	942	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1046			505			2936				
v/s Ratio Prot					c0.20							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.06			0.59			0.32				
Uniform Delay, d1		10.2			12.4			7.0				
Progression Factor		1.87			1.00			0.89				
Incremental Delay, d2		0.1			4.9			0.3				
Delay (s)		19.2			17.4			6.5				
Level of Service		B			B			A				
Approach Delay (s)		19.2			17.4			6.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↰↑↑↑	
Volume (vph)	0	0	0	125	431	0	0	0	0	0	909	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6023						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6023						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	136	468	0	0	0	0	0	988	117
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	564	0	0	0	0	0	1072	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2275						2204	
v/s Ratio Prot											c0.23	
v/s Ratio Perm					0.09							
v/c Ratio					0.25						0.49	
Uniform Delay, d1					9.6						8.3	
Progression Factor					1.12						0.77	
Incremental Delay, d2					0.3						0.7	
Delay (s)					11.0						7.1	
Level of Service					B						A	
Approach Delay (s)		0.0			11.0			0.0			7.1	
Approach LOS		A			B			A			A	

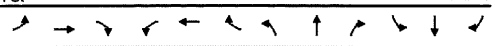
Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑			↰↑↑↑				
Volume (vph)	0	0	0	0	380	93	177	752	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5902			6052				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5902			6052				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	413	101	192	817	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	50	0	0	94	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	464	0	0	915	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2361			2555				
v/s Ratio Prot					c0.08							
v/s Ratio Perm								0.15				
v/c Ratio					0.20			0.36				
Uniform Delay, d1					8.8			8.8				
Progression Factor					1.00			2.20				
Incremental Delay, d2					0.2			0.3				
Delay (s)					9.0			19.8				
Level of Service					A			B				
Approach Delay (s)		0.0			9.0			19.8			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

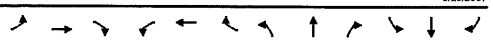
HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1100	305	0	0	0	0	0	0	285	638	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5881									4707	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5881									4707	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1196	332	0	0	0	0	0	0	310	911	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	1500	0	0	0	0	0	0	0	0	1204	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2614									1883	
v/s Ratio Prot		c0.25										
v/s Ratio Perm											0.26	
v/c Ratio		0.57									0.64	
Uniform Delay, d1		9.3									10.9	
Progression Factor		1.00									2.03	
Incremental Delay, d2		0.9									1.5	
Delay (s)		10.2									23.7	
Level of Service		B									C	
Approach Delay (s)		10.2			0.0			0.0			23.7	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

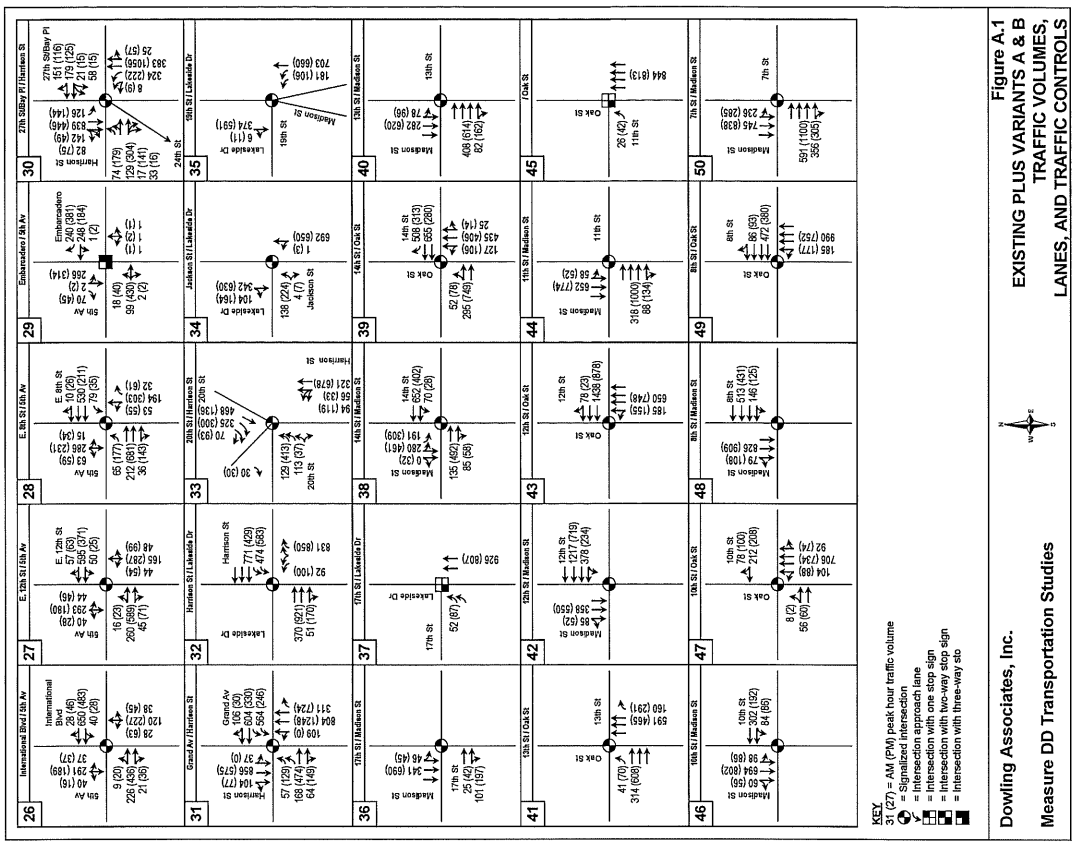
HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St 5/23/2007

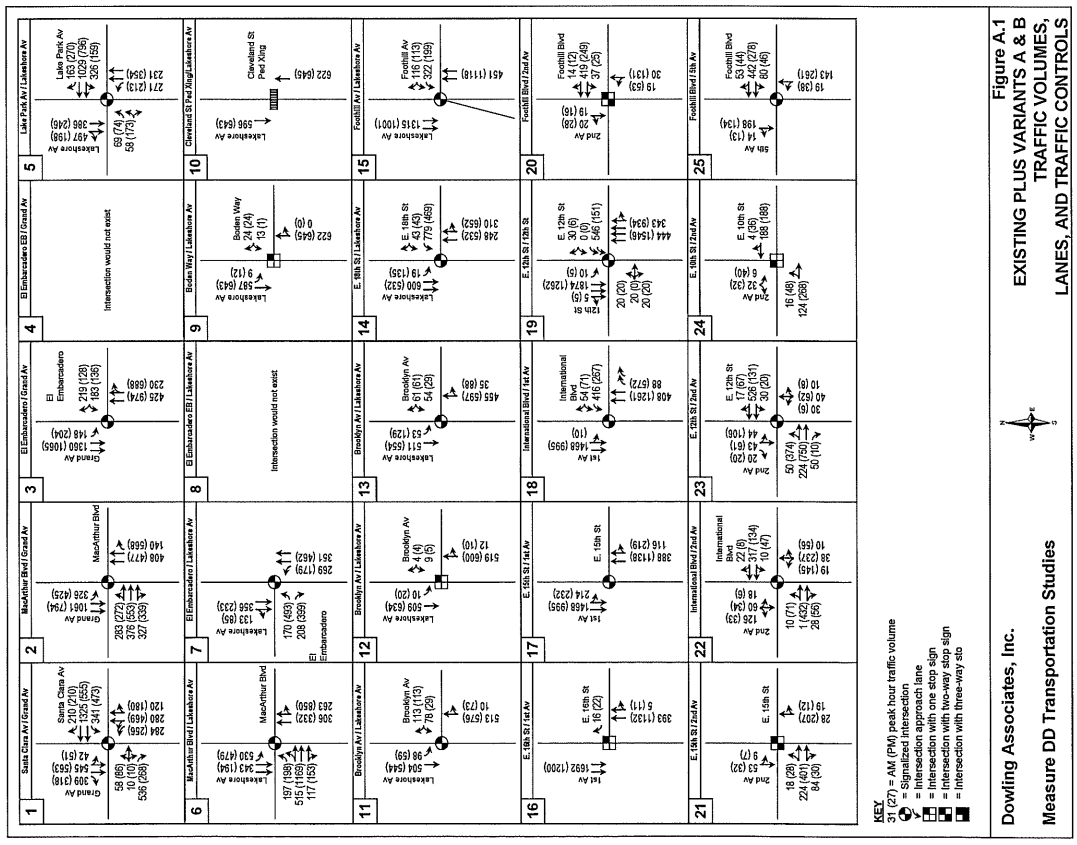


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	1024	0	0	0	0	0	733	238	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.98				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6071						4572				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6071						4572				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	1113	0	0	0	0	0	797	259	0	0	0
RTOR Reduction (vph)	0	46	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1269	0	0	0	0	0	1041	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2428						1829				
v/s Ratio Prot								c0.23				
v/s Ratio Perm		0.21										
v/c Ratio		0.52						0.57				
Uniform Delay, d1		10.2						10.5				
Progression Factor		1.36						1.00				
Incremental Delay, d2		0.7						1.3				
Delay (s)		14.6						11.8				
Level of Service		B						B				
Approach Delay (s)		14.6			0.0			11.8			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Existing Conditions Plus Project


KEY
31 (27) = AM (PM) peak hour traffic volume
= Signalized intersection
= Intersection approach lane
= Intersection with one stop sign
= Intersection with two-way stop sign
= Intersection with three-way sto
Dowling Associates, Inc.
Measure DD Transportation Studies
Figure A.1
EXISTING PLUS VARIANTS A & B
TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS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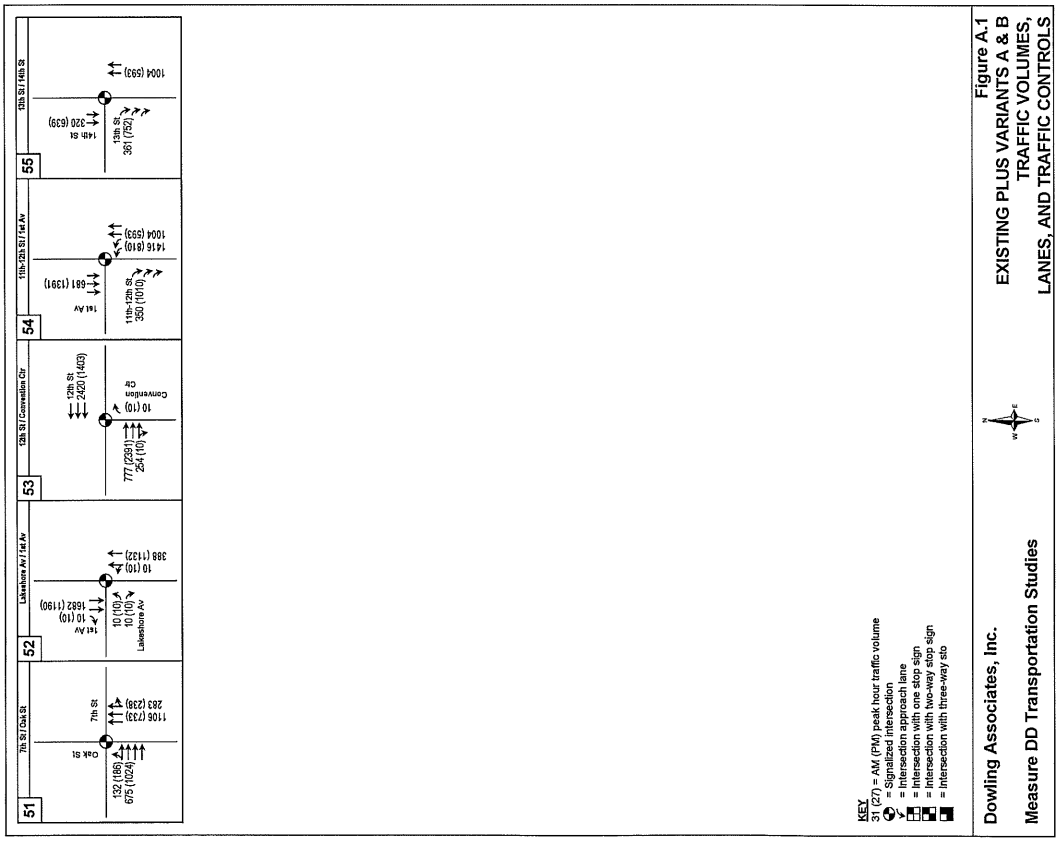


Dowling Associates, Inc.

Measure DD Transportation Studies

Figure A.1
EXISTING PLUS VARIANTS A & B
TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	10	536	341	1325	210	284	280	120	42	545	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.98			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	0.99			1.00	1.00
Satd. Flow (prot)		1441	1279	1596	3539	1319	1610	2964			3517	1291
Flt Permitted		0.28	1.00	0.60	1.00	1.00	0.95	0.69			0.87	1.00
Satd. Flow (perm)		409	1279	1003	3539	1319	1610	2067			3071	1291
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.95	0.95	0.95	0.78	0.78	0.78
Adj. Flow (vph)	65	11	602	363	1410	223	299	295	126	54	699	396
RTOR Reduction (vph)	0	51	179	0	0	41	0	31	0	0	0	15
Lane Group Flow (vph)	0	139	309	363	1410	182	299	450	0	0	753	381
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.6	48.6	48.6	48.6	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		187	585	459	1619	604	190	1052			927	390
v/s Ratio Prot					c0.40		c0.15	0.05				
v/s Ratio Perm		0.34	0.24	0.36		0.14		0.15			0.25	c0.29
v/c Ratio		0.74	0.53	0.79	0.87	0.30	1.26	0.43			0.81	0.98
Uniform Delay, d1		23.6	20.6	24.4	25.9	18.1	46.8	19.4			34.2	36.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.71	1.61			1.00	1.00
Incremental Delay, d2		23.2	3.4	13.0	6.7	1.3	147.0	1.1			7.7	39.9
Delay (s)		46.8	24.0	37.5	32.6	19.4	180.2	32.3			41.9	76.6
Level of Service		D	C	D	C	B	F	C			D	E
Approach Delay (s)		30.4			32.0			81.4			53.9	
Approach LOS		C			C			F			D	

Intersection Summary				
HCM Average Control Delay	45.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	114.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	283	376	327	0	0	0	0	408	140	326	1061	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.98						1.00	1.00	1.00	1.00	
Frt		0.95						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4330						3539	1329	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4330						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.91	0.91	0.91	0.86	0.88	0.88
Adj. Flow (vph)	292	388	337	0	0	0	0	448	154	370	1206	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	974	0	0	0	0	0	448	154	370	1206	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1491						968	1329	459	1894	
v/s Ratio Prot								0.13		c0.21		
v/s Ratio Perm		0.23							0.12		c0.36	
v/c Ratio		0.65						0.46	0.12	0.81	0.64	
Uniform Delay, d1		29.4						32.0	0.0	36.8	15.3	
Progression Factor		1.00						1.00	1.00	1.00	0.69	
Incremental Delay, d2		2.2						1.6	0.2	9.3	1.0	
Delay (s)		31.6						33.6	0.2	46.0	11.7	
Level of Service		C						C	A	D	B	
Approach Delay (s)		31.6			0.0			25.1			19.7	
Approach LOS		C			A			C			B	

Intersection Summary				
HCM Average Control Delay	24.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	68.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	183	219	425	230	148	1360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0		4.0	5.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.98		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.93		0.95		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1661		3353		1770	3318
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1661		3353		1770	3318
Peak-hour factor, PHF	0.71	0.71	0.91	0.91	0.90	0.90
Adj. Flow (vph)	258	308	467	253	164	1511
RTOR Reduction (vph)	73	0	118	0	0	0
Lane Group Flow (vph)	493	0	602	0	164	1511
Confl. Peds. (#/hr)	70	7				
Confl. Bikes (#/hr)		16				
Parking (#/hr)						5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	19.0		19.5		7.6	31.1
Effective Green, g (s)	19.0		19.5		7.6	31.1
Actuated g/C Ratio	0.32		0.33		0.13	0.53
Clearance Time (s)	4.0		5.0		4.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	534		1106		228	1746
v/s Ratio Prot	c0.30		0.18		0.09	c0.46
v/s Ratio Perm						
v/c Ratio	0.92		0.54		0.72	0.87
Uniform Delay, d1	19.4		16.2		24.7	12.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	21.5		1.9		8.7	6.0
Delay (s)	40.9		18.1		33.4	18.2
Level of Service	D		B		C	B
Approach Delay (s)	40.9		18.1			19.7
Approach LOS	D		B			B

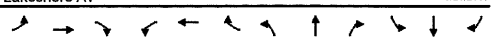
Intersection Summary				
HCM Average Control Delay	23.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	0	58	326	1029	163	271	231	0	0	386	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.85			1.00	0.97	1.00	1.00			0.92	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.87			1.00	0.85	1.00	1.00			0.92	
Flt Protected	0.95	0.99			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1128			3497	1338	1770	3539			2781	
Flt Permitted	0.95	0.99			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1128			3497	1338	1770	3539			2781	
Peak-hour factor, PHF	0.86	0.86	0.86	0.96	0.96	0.78	0.78	0.78	0.94	0.94	0.94	0.94
Adj. Flow (vph)	80	0	67	340	1072	170	347	296	0	0	411	529
RTOR Reduction (vph)	0	64	0	0	0	72	0	0	0	0	74	0
Lane Group Flow (vph)	72	11	0	0	1412	98	347	296	0	0	866	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)						5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Effective Green, g (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Actuated g/C Ratio	0.04	0.04			0.31	0.31	0.16	0.51			0.29	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	63	42			1093	418	288	1792			817	
v/s Ratio Prot	c0.04	0.01			c0.40		c0.20	0.08			c0.31	
v/s Ratio Perm						0.07						
v/c Ratio	1.14	0.25			1.29	0.23	1.20	0.17			1.17dr	
Uniform Delay, d1	38.5	37.4			27.5	20.4	33.5	10.6			28.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	157.6	1.1			138.3	1.3	120.3	0.0			48.5	
Delay (s)	196.1	38.5			165.8	21.7	153.8	10.7			76.8	
Level of Service	F	D			F	C	F	B			E	
Approach Delay (s)		115.7			150.3			87.9			76.8	
Approach LOS		F			F			F			E	

Intersection Summary				
HCM Average Control Delay	115.8	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	97.0%	ICU Level of Service	F	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

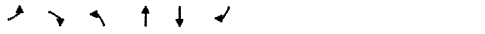
HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	515	117	0	0	0	0	306	263	530	343	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.93		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1516	4611						3012		1768	3539	
Flt Permitted	0.95	1.00						1.00		0.19	1.00	
Satd. Flow (perm)	1516	4611						3012		359	3539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	219	572	130	0	0	0	0	360	309	609	394	0
RTOR Reduction (vph)	0	29	0	0	0	0	0	61	0	0	0	0
Lane Group Flow (vph)	197	695	0	0	0	0	0	608	0	609	394	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)						0		5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1349						881		642	2204	
v/s Ratio Prot								0.20		c0.28	0.11	
v/s Ratio Perm	0.13	0.15								c0.31		
v/c Ratio	0.44	0.52						0.69		0.95	0.18	
Uniform Delay, d1	30.5	31.2						33.2		24.2	8.5	
Progression Factor	0.99	0.99						1.00		1.00	1.00	
Incremental Delay, d2	2.5	1.1						4.4		24.9	0.2	
Delay (s)	32.6	32.0						37.7		49.1	8.7	
Level of Service	C	C						D		D	A	
Approach Delay (s)		32.2			0.0			37.7			33.2	
Approach LOS		C			A			D			C	

Intersection Summary				
HCM Average Control Delay	34.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	79.7%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

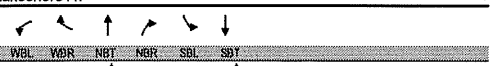
HCM Signalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	170	208	269	351	356	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1530	1770	3539	3054	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1530	1770	3539	3054	
Peak-hour factor, PHF	0.90	0.90	0.88	0.88	0.92	0.92
Adj. Flow (vph)	189	231	306	399	387	145
RTOR Reduction (vph)	0	174	0	0	62	0
Lane Group Flow (vph)	189	57	306	399	470	0
Confl. Peds. (#/hr)	15	12	65			65
Confl. Bikes (#/hr)		18				9
Parking (#/hr)					5	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	10.8	10.8	10.4	24.9	10.5	
Effective Green, g (s)	10.8	10.8	10.4	24.9	10.5	
Actuated g/C Ratio	0.25	0.25	0.24	0.57	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	437	378	421	2017	734	
v/s Ratio Prot	c0.11		c0.17	0.11	c0.15	
v/s Ratio Perm		0.04				
v/c Ratio	0.43	0.15	0.73	0.20	0.64	
Uniform Delay, d1	13.9	12.9	15.3	4.6	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.1	5.2	0.0	1.4	
Delay (s)	14.1	12.9	20.6	4.6	16.3	
Level of Service	B	B	C	A	B	
Approach Delay (s)	13.5			11.5	16.3	
Approach LOS	B			B	B	

Intersection Summary				
HCM Average Control Delay	13.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	53.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

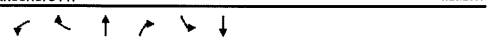
HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	622	0	0	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.91	0.91
Adj. Flow (vph)	0	0	655	0	0	655
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	655	0	0	655
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.40			0.40
v/s Ratio Perm						
v/c Ratio			0.48			0.48
Uniform Delay, d1			2.5			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.1
Delay (s)			2.5			2.5
Level of Service			A			A
Approach Delay (s)	0.0		2.5			2.5
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	36.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	78	113	513	10	98	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.91		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.92		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1334		1621		1770	1863
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1334		1621		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	123	558	11	107	548
RTOR Reduction (vph)	103	0	1	0	0	0
Lane Group Flow (vph)	105	0	568	0	107	548
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	6.2		20.0		2.8	26.8
Effective Green, g (s)	6.2		20.0		2.8	26.8
Actuated g/C Ratio	0.16		0.51		0.07	0.69
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	212		831		127	1280
v/s Ratio Prot	c0.08		c0.35		c0.06	0.29
v/s Ratio Perm						
v/c Ratio	0.49		0.68		0.84	0.43
Uniform Delay, d1	15.0		7.1		17.9	2.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.7		1.9		35.9	0.1
Delay (s)	15.6		9.0		53.7	2.8
Level of Service	B		A		D	A
Approach Delay (s)	15.6		9.0			11.1
Approach LOS	B		A			B

Intersection Summary				
HCM Average Control Delay	10.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	57.3%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	24	622	0	9	587
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.46	0.46	0.95	0.95	0.91	0.91
Hourly flow rate (vph)	28	52	655	0	10	645
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	80	655	10	645
Volume Left	28	0	10	0
Volume Right	52	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	4	519	12	10	509
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	13	6	583	13	11	536
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.85	0.82			0.82	
vC, conflicting volume	1175	607			613	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	968	413			420	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			99	
cM capacity (veh/h)	231	518			923	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	19	597	11	536
Volume Left	13	0	11	0
Volume Right	6	13	0	0
cSH	279	1700	923	1700
Volume to Capacity	0.07	0.35	0.01	0.32
Queue Length 95th (ft)	5	0	1	0
Control Delay (s)	18.9	0.0	8.9	0.0
Lane LOS	C		A	
Approach Delay (s)	18.9	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	393	5	0	1692
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	427	5	0	1839
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.74	0.99			0.99	
vC, conflicting volume	1419	356			503	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	794	323			472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	227	589			1011	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	285	148	920	920
Volume Left	0	0	0	0	0
Volume Right	17	0	5	0	0
cSH	589	1700	1700	1700	1700
Volume to Capacity	0.03	0.17	0.09	0.54	0.54
Queue Length 95th (ft)	2	0	0	0	0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.3	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	37	419	14	19	30	0	0	19	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.61	0.61	0.61	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	42	476	16	31	49	0	0	21	22
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	495			26			406	605	26	596	597	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			26			406	605	26	596	597	274
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			93	87	100	100	95	97
cM capacity (veh/h)	1062			1552			462	390	1021	336	394	722

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	280	254	80	44
Volume Left	42	0	31	0
Volume Right	0	16	0	22
cSH	1552	1700	415	513
Volume to Capacity	0.03	0.15	0.19	0.09
Queue Length 95th (ft)	2	0	18	7
Control Delay (s)	1.3	0.0	15.7	12.7
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.7	12.7
Approach LOS			C	B

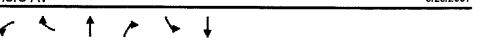
Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	54	61	455	35	53	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.96		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.93		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1421		1607		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1421		1607		1770	1630
Peak-hour factor, PHF	0.86	0.86	0.87	0.87	0.96	0.96
Adj. Flow (vph)	63	71	523	40	55	532
RTOR Reduction (vph)	47	0	5	0	0	0
Lane Group Flow (vph)	87	0	558	0	55	532
Confl. Peds. (#/hr)	70	31		17	17	
Confl. Bikes (#/hr)		7		15		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		24.0		5.0	33.0
Effective Green, g (s)	20.0		24.0		5.0	33.0
Actuated g/C Ratio	0.33		0.40		0.08	0.55
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	474		643		148	897
v/s Ratio Prot	c0.06		c0.35		0.03	c0.33
v/s Ratio Perm						
v/c Ratio	0.18		0.87		0.37	0.59
Uniform Delay, d1	14.2		16.5		26.0	9.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.8		14.8		7.0	2.9
Delay (s)	15.0		31.3		33.0	11.9
Level of Service	B		C		C	B
Approach Delay (s)	15.0		31.3			13.9
Approach LOS	B		C			B

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

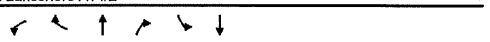
HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	779	43	248	310	19	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.96		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.95		1.00		0.95	1.00
Satd. Flow (prot)	3363		2910		1770	3539
Flt Permitted	0.95		1.00		0.95	1.00
Satd. Flow (perm)	3363		2910		1770	3539
Peak-hour factor, PHF	0.93	0.93	0.90	0.90	0.92	0.92
Adj. Flow (vph)	838	46	276	344	21	652
RTOR Reduction (vph)	5	0	158	0	0	0
Lane Group Flow (vph)	879	0	462	0	21	652
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	29.5		48.7		2.8	54.5
Effective Green, g (s)	29.5		48.7		2.8	54.5
Actuated g/C Ratio	0.33		0.54		0.03	0.61
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	1102		1575		55	2143
v/s Ratio Prot	c0.26		0.16		0.01	
v/s Ratio Perm						c0.18
v/c Ratio	0.80		0.29		0.38	0.30
Uniform Delay, d1	27.5		11.3		42.8	8.6
Progression Factor	1.00		0.93		1.00	1.00
Incremental Delay, d2	3.8		0.5		1.6	0.4
Delay (s)	31.4		11.0		44.4	8.9
Level of Service	C		B		D	A
Approach Delay (s)	31.4		11.0			10.1
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Foothill Blvd #2 & Lakeshore Av #2 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	322	116	451	0	0	1315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.96		1.00			1.00
Flt Protected	0.96		1.00			1.00
Satd. Flow (prot)	3187		3406			3406
Flt Permitted	0.96		1.00			1.00
Satd. Flow (perm)	3187		3406			3406
Peak-hour factor, PHF	0.90	0.90	0.82	0.82	0.87	0.87
Adj. Flow (vph)	358	129	550	0	0	1511
RTOR Reduction (vph)	42	0	0	0	0	0
Lane Group Flow (vph)	445	0	550	0	0	1511
Confl. Peds. (#/hr)		43				
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	22.5		61.0			61.0
Effective Green, g (s)	22.5		61.0			61.0
Actuated g/C Ratio	0.25		0.68			0.68
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	797		2309			2309
v/s Ratio Prot	c0.14		0.16			c0.44
v/s Ratio Perm						
v/c Ratio	0.56		0.24			0.65
Uniform Delay, d1	29.4		5.6			8.4
Progression Factor	1.00		0.61			0.59
Incremental Delay, d2	2.8		0.2			1.3
Delay (s)	32.2		3.7			6.3
Level of Service	C		A			A
Approach Delay (s)	32.2		3.7			6.3
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	388	116	214	1466
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.97			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3262			3400
Flt Permitted			1.00			0.76
Satd. Flow (perm)			3262			2610
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	0	0	436	130	233	1596
RTOR Reduction (vph)	0	0	13	0	0	0
Lane Group Flow (vph)	0	0	553	0	0	1829
Confl. Peds. (#/hr)				17		
Confl. Bikes (#/hr)				4		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type					pm+pt	
Protected Phases			2		1 4	6
Permitted Phases					6	
Actuated Green, G (s)			76.4			82.0
Effective Green, g (s)			76.4			82.0
Actuated g/C Ratio			0.85			0.91
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2769			2427
v/s Ratio Prot			0.17			c0.05
v/s Ratio Perm						c0.64
v/c Ratio			0.20			0.75
Uniform Delay, d1			1.2			1.1
Progression Factor			0.28			10.35
Incremental Delay, d2			0.2			1.0
Delay (s)			0.5			12.7
Level of Service			A			B
Approach Delay (s)	0.0		0.5			12.7
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	416	54	408	88	0	1468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.99		1.00	0.96		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3294		3406	2619		3406
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3294		3406	2619		3406
Peak-hour factor, PHF	0.85	0.85	0.91	0.91	0.89	0.89
Adj. Flow (vph)	489	64	448	97	0	2128
RTOR Reduction (vph)	13	0	0	29	0	0
Lane Group Flow (vph)	540	0	448	68	0	2128
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	19.0		63.0	63.0		63.0
Effective Green, g (s)	19.0		63.0	63.0		63.0
Actuated g/C Ratio	0.21		0.70	0.70		0.70
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	695		2384	1833		2384
v/s Ratio Prot	c0.16		0.13			c0.62
v/s Ratio Perm				0.03		
v/c Ratio	0.78		0.19	0.04		0.89
Uniform Delay, d1	33.5		4.7	4.2		10.8
Progression Factor	1.00		0.39	0.00		0.63
Incremental Delay, d2	5.0		0.2	0.0		4.8
Delay (s)	38.5		2.0	0.0		11.7
Level of Service	D		A	A		B
Approach Delay (s)	38.5		1.6			11.7
Approach LOS	D		A			B

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Driveway & 1st Ave #1#2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	546	0	30	0	444	343	10	1874	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0					4.0	4.0
Lane Util. Factor		1.00			0.91	0.91					1.00	0.91
Frpb, ped/bikes		0.94			1.00	0.98					1.00	1.00
Flpb, ped/bikes		1.00			1.00	1.00					0.97	1.00
Frt		0.96			1.00	0.98					1.00	1.00
Flt Protected		0.98			0.95	0.96					0.95	1.00
Satd. Flow (prot)		1639			3221	1366					1713	4890
Flt Permitted		0.98			0.95	0.96					0.95	1.00
Satd. Flow (perm)		1639			3221	1366					1713	4890
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	593	0	33	0	483	373	11	2037	5
RTOR Reduction (vph)	0	20	0	0	9	0	0	112	0	0	0	0
Lane Group Flow (vph)	0	46	0	421	196	0	0	744	0	11	2042	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split							Prot	
Protected Phases	4	4		8	8			2			1	6
Permitted Phases												
Actuated Green, G (s)		6.7			18.2	18.2		48.3			0.8	53.1
Effective Green, g (s)		6.7			18.2	18.2		48.3			0.8	53.1
Actuated g/C Ratio		0.07			0.20	0.20		0.54			0.01	0.59
Clearance Time (s)		4.0			4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0	2.0		2.0			2.0	2.0
Lane Grp Cap (vph)		122			651	276		2879			15	2885
v/s Ratio Prot		c0.03			0.13	c0.14		0.14			0.01	c0.42
v/s Ratio Perm												
v/c Ratio		0.37			0.65	0.71		0.26			0.73	0.71
Uniform Delay, d1		39.7			32.9	33.4		11.2			44.5	13.0
Progression Factor		1.00			0.96	0.93		0.12			1.00	1.00
Incremental Delay, d2		0.7			1.5	6.4		0.2			57.0	0.8
Delay (s)		40.4			33.2	37.5		1.5			101.4	13.8
Level of Service		D			C	D		A			F	B
Approach Delay (s)		40.4				34.6		1.5				14.3
Approach LOS		D				C		A				B

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1	28	10	317	22	19	38	10	18	60	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.93			0.99			0.99			0.95	
Flpb, ped/bikes		0.99			1.00			0.99			0.99	
Frt		0.89			0.99			0.98			0.92	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		2681			3198			1530			1400	
Flt Permitted		0.87			0.95			0.92			0.98	
Satd. Flow (perm)		2364			3041			1433			1380	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	30	11	345	24	21	41	11	20	65	137
RTOR Reduction (vph)	0	24	0	0	16	0	0	3	0	0	36	0
Lane Group Flow (vph)	0	18	0	0	364	0	0	70	0	0	186	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		12.5			12.5			46.5			46.5	
Effective Green, g (s)		12.5			12.5			46.5			46.5	
Actuated g/C Ratio		0.19			0.19			0.72			0.72	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		455			585			1025			987	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.12			0.05			c0.13	
v/c Ratio		0.04			0.62			0.07			0.19	
Uniform Delay, d1		21.4			24.1			2.8			3.0	
Progression Factor		1.00			0.49			1.00			1.00	
Incremental Delay, d2		0.0			1.3			0.1			0.4	
Delay (s)		21.4			13.1			2.9			3.5	
Level of Service		C			B			A			A	
Approach Delay (s)		21.4			13.1			2.9			3.5	
Approach LOS		C			B			A			A	

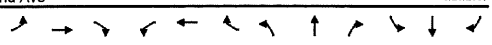
Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: E. 12TH & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	224	50	30	526	17	30	40	10	44	43	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00			0.99			1.00	0.92
Flpb, ped/bikes		0.99			1.00			0.98			0.97	1.00
Frt		0.98			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.98	1.00
Satd. Flow (prot)		3125			3487			1526			1769	1459
Flt Permitted		0.83			0.93			0.88			0.83	1.00
Satd. Flow (perm)		2618			3241			1364			1510	1459
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	243	54	33	572	18	33	43	11	48	47	22
RTOR Reduction (vph)	0	32	0	0	5	0	0	7	0	0	0	14
Lane Group Flow (vph)	0	319	0	0	618	0	0	80	0	0	95	8
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5			5			5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		18.5			18.5			17.0			17.0	17.0
Effective Green, g (s)		18.5			18.5			17.0			17.0	17.0
Actuated g/C Ratio		0.41			0.41			0.38			0.38	0.38
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1076			1332			515			570	551
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.19			0.06			c0.06	0.01
v/c Ratio		0.30			0.46			0.16			0.17	0.02
Uniform Delay, d1		8.9			9.6			9.3			9.3	8.8
Progression Factor		0.53			1.00			1.06			1.00	1.00
Incremental Delay, d2		0.7			1.2			0.6			0.6	0.1
Delay (s)		5.4			10.8			10.5			9.9	8.8
Level of Service		A			B			B			A	A
Approach Delay (s)		5.4			10.8			10.5			9.7	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

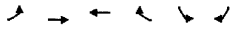


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	224	64	0	0	0	0	28	19	9	53	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.59	0.59	0.59	0.78	0.78	0.78
Hourly flow rate (vph)	20	246	92	0	0	0	0	47	32	12	68	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	17			365			393	376	226	266	422	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			287			315	297	143	184	345	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	92	96	98	87	100
cM capacity (veh/h)	1576			1208			607	566	833	631	533	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	143	215	80	79
Volume Left	20	0	0	12
Volume Right	0	92	32	0
cSH	1576	1700	651	545
Volume to Capacity	0.01	0.13	0.12	0.15
Queue Length 95th (ft)	1	0	10	13
Control Delay (s)	1.1	0.0	11.3	12.7
Lane LOS	A		B	B
Approach Delay (s)	0.4		11.3	12.7
Approach LOS			B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007

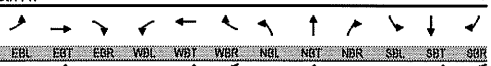


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	16	124	188	4	6	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	135	204	4	7	35
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				516	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				516	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	94
cM capacity (veh/h)	1209				454	618

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	152	209	41
Volume Left	17	0	7
Volume Right	0	4	35
cSH	1209	1700	584
Volume to Capacity	0.01	0.12	0.07
Queue Length 95th (ft)	1	0	6
Control Delay (s)	1.0	0.0	11.6
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	11.6
Approach LOS			B

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

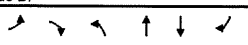


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	99	2	1	248	240	1	1	1	266	2	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	108	2	1	270	261	1	1	1	289	2	76

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	129	271	261	3	291	76
Volume Left (vph)	20	1	0	1	289	0
Volume Right (vph)	2	0	261	1	0	76
Hadj (s)	0.05	0.04	-0.67	-0.10	0.53	-0.67
Departure Headway (s)	6.4	5.9	5.2	6.8	6.7	5.5
Degree Utilization, x	0.23	0.45	0.38	0.01	0.54	0.12
Capacity (veh/h)	532	586	664	475	515	617
Control Delay (s)	11.3	12.4	10.2	9.8	16.2	8.0
Approach Delay (s)	11.3	11.3		9.8	14.5	
Approach LOS	B	B		A	B	

Intersection Summary				
Delay	12.5			
HCM Level of Service	B			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	52	0	0	926	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	68	0	0	1040	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked	0.95					
vC, conflicting volume	500	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	100	100			
cM capacity (veh/h)	497	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	34	34	520	520
Volume Left	34	34	0	0
Volume Right	0	0	0	0
cSH	497	497	1700	1700
Volume to Capacity	0.07	0.07	0.31	0.31
Queue Length 95th (ft)	6	6	0	0
Control Delay (s)	12.8	12.8	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	12.8		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	80	442	53	19	143	0	0	198	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3219			1655			1651	
Flt Permitted					0.99			0.96			1.00	
Satd. Flow (perm)					3219			1599			1651	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	87	480	58	21	155	0	0	215	15
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	613	0	0	176	0	0	226	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1337			775			800	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.19			0.11				
v/c Ratio					0.46			0.23			0.28	
Uniform Delay, d1					13.7			9.7			10.0	
Progression Factor					1.00			0.97			1.00	
Incremental Delay, d2					1.1			0.7			0.9	
Delay (s)					14.9			10.1			10.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			14.9			10.1			10.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	226	21	40	650	28	26	120	38	37	291	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3283			3310			1590			1626	
Flt Permitted		0.93			0.93			0.92			0.96	
Satd. Flow (perm)		3066			3073			1468			1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	246	23	43	707	30	30	130	41	40	316	43
RTOR Reduction (vph)	0	10	0	0	4	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	269	0	0	776	0	0	187	0	0	392	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1391			1395			632			673	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.25			0.13			c0.25	
v/c Ratio		0.19			0.56			0.30			0.58	
Uniform Delay, d1		10.6			13.0			12.1			14.1	
Progression Factor		1.00			1.00			1.06			0.74	
Incremental Delay, d2		0.3			1.6			1.1			3.6	
Delay (s)		10.9			14.6			13.8			13.9	
Level of Service		B			B			B			B	
Approach Delay (s)		10.9			14.6			13.8			13.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	260	45	50	695	57	44	165	48	44	293	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3235			3273			1591			1624	
Flt Permitted		0.92			0.91			0.90			0.94	
Satd. Flow (perm)		2972			2979			1450			1533	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	283	49	54	647	62	48	179	52	48	318	43
RTOR Reduction (vph)	0	20	0	0	10	0	0	13	0	0	7	0
Lane Group Flow (vph)	0	329	0	0	753	0	0	266	0	0	402	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1509			1512			558			590	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.25			0.18			c0.26	
v/c Ratio		0.22			0.50			0.48			0.68	
Uniform Delay, d1		8.9			10.5			15.1			16.7	
Progression Factor		1.00			1.00			0.67			0.74	
Incremental Delay, d2		0.3			1.2			2.8			5.4	
Delay (s)		9.2			11.7			12.9			17.7	
Level of Service		A			B			B			B	
Approach Delay (s)		9.2			11.7			12.9			17.7	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	12.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	69.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	212	36	79	530	10	53	194	32	15	286	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.91		0.99	
Flpb, ped/bikes	0.96	1.00		0.94	1.00			0.99	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1703	4726		1683	4801			1647	1448		1607	
Flt Permitted	0.40	1.00		0.58	1.00			0.87	1.00		0.99	
Satd. Flow (perm)	712	4726		1014	4891			1445	1448		1588	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	230	39	86	576	11	58	211	35	16	311	68
RTOR Reduction (vph)	0	22	0	0	3	0	0	0	19	0	11	0
Lane Group Flow (vph)	71	247	0	86	584	0	0	269	16	0	384	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	307	2036		437	2107			667	668		733	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm	0.10			0.08				0.19	0.01		c0.24	
v/c Ratio	0.23	0.12		0.20	0.28			0.40	0.02		0.52	
Uniform Delay, d1	11.7	11.1		11.5	12.0			11.6	9.5		12.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.50	
Incremental Delay, d2	1.8	0.1		1.0	0.3			1.8	0.1		2.1	
Delay (s)	13.5	11.2		12.5	12.3			13.4	9.6		8.3	
Level of Service	B	B		B	B			B	A		A	
Approach Delay (s)		11.7			12.3			13.0			8.3	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM Average Control Delay	11.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	6	324	383	25	126	839	142	82	74	129	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.93		
Flpb, ped/bikes		1.00	1.00		0.98	1.00			0.97	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.96		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3288		1734	3063			1558	2828		
Flt Permitted		0.21	1.00		0.50	1.00			0.42	0.94		
Satd. Flow (perm)		761	3288		904	3063			695	2652		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	6	352	416	27	137	912	154	89	80	140	18	36
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	0	19	0	0
Lane Group Flow (vph)	0	361	438	0	137	1148	0	0	72	183	0	0
Confl. Peds. (#/hr)					70		70	70	70		70	70
Confl. Bikes (#/hr)							16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Perm				Perm			
Protected Phases		5	2			6				4		
Permitted Phases	5				6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		161	1863		271	919			224	855		
v/s Ratio Prot			0.13			c0.37						
v/s Ratio Perm		c0.47			0.15				0.10	0.07		
v/c Ratio		2.24	0.23		0.51	1.25			0.32	0.21		
Uniform Delay, d1		35.5	9.7		26.0	31.5			23.1	22.2		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		578.5	0.3		6.6	121.2			3.8	0.6		
Delay (s)		614.0	10.0		32.6	152.7			26.8	22.8		
Level of Service		F	B		C	F			C	C		
Approach Delay (s)			281.2			140.0				23.8		
Approach LOS			F			F				C		

Intersection Summary			
HCM Average Control Delay	150.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	58	21	179	151
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.97	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3105	
Flt Permitted			0.84	
Satd. Flow (perm)			2619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	23	195	164
RTOR Reduction (vph)	0	0	94	0
Lane Group Flow (vph)	0	0	351	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			844	
v/s Ratio Prot				
v/s Ratio Perm			c0.13	
v/c Ratio			0.42	
Uniform Delay, d1			23.9	
Progression Factor			1.00	
Incremental Delay, d2			1.5	
Delay (s)			25.4	
Level of Service			C	
Approach Delay (s)			25.4	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	168	64	564	604	106	109	804	311	37	856	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3257		3400	3364			5004	1464		4699	
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.82	
Satd. Flow (perm)	3433	3257		3400	3364			3307	1464		3854	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	58	171	65	613	657	115	118	874	338	41	951	116
RTOR Reduction (vph)	0	19	0	0	14	0	0	0	234	0	15	0
Lane Group Flow (vph)	58	217	0	613	758	0	0	992	104	0	1093	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			5			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Effective Green, g (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Actuated g/C Ratio	0.06	0.15		0.37	0.47			0.31	0.31		0.31	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	198	482		1255	1585			1014	449		1182	
v/s Ratio Prot	0.02	c0.07		0.18	c0.23							
v/s Ratio Perm								c0.30	0.07		0.28	
v/c Ratio	0.29	0.45		0.49	0.48			1.34d	0.23		0.93	
Uniform Delay, d1	38.4	33.1		20.7	15.4			29.2	22.0		28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.2		0.1	1.0			22.7	0.1		11.9	
Delay (s)	38.7	33.3		20.8	16.4			52.0	22.1		40.5	
Level of Service	D	C		C	B			D	C		D	
Approach Delay (s)		34.4			18.3			44.4			40.5	
Approach LOS		C			B			D			D	

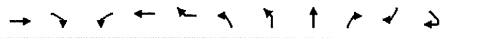
Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		
d Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
32: 20th St #3 & Lakeside Dr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	370	51	474	771	92	831
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.99		1.00	1.00	0.90	0.88
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.88	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4747		3367	4893	2814	1264
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4747		3367	4893	2814	1264
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.94	0.92
Adj. Flow (vph)	402	53	515	838	98	903
RTOR Reduction (vph)	21	0	0	0	283	282
Lane Group Flow (vph)	434	0	515	838	268	169
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	19.0		19.0	42.0	30.0	30.0
Effective Green, g (s)	19.0		19.0	42.0	30.0	30.0
Actuated g/C Ratio	0.24		0.24	0.52	0.38	0.38
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1127		800	2569	1055	474
v/s Ratio Prot	c0.09		c0.15	0.17	0.10	
v/s Ratio Perm						c0.13
v/c Ratio	0.39		0.64	0.33	0.25	0.36
Uniform Delay, d1	25.6		27.5	10.9	17.3	18.0
Progression Factor	0.99		0.88	0.95	1.00	1.00
Incremental Delay, d2	0.9		3.0	0.3	0.6	2.1
Delay (s)	26.4		27.1	10.6	17.8	20.1
Level of Service	C		C	B	B	C
Approach Delay (s)	26.4			16.9	18.9	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

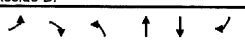


Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	129	113	468	326	70	94	56	0	321	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.94		1.00	1.00	0.83			0.97	0.91	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.93		1.00	1.00	0.85			0.94	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4366		1770	3406	1317			1562	1407	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4366		1770	3406	1317			1562	1407	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	140	123	509	353	76	102	61	0	349	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	28	174	0	0
Lane Group Flow (vph)	263	0	509	353	76	0	0	236	74	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Effective Green, g (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Actuated g/C Ratio	0.21		0.34	0.48	0.48			0.30	0.30	0.08	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	928		597	1618	626			469	422	121	1611
v/s Ratio Prot	c0.06		c0.29	0.10				c0.15		0.02	
v/s Ratio Perm					0.06				0.05		0.01
v/c Ratio	0.28		0.85	0.22	0.12			0.50	0.18	0.27	0.01
Uniform Delay, d1	26.4		24.6	12.3	11.7			23.1	20.7	34.9	0.0
Progression Factor	1.00		0.63	0.30	0.26			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8		13.8	0.3	0.4			3.8	0.9	5.5	0.0
Delay (s)	27.2		29.4	4.0	3.4			26.9	21.6	40.4	0.0
Level of Service	C		C	A	A			C	C	D	A
Approach Delay (s)	27.2			17.7				24.3			
Approach LOS	C			B				C			

Intersection Summary				
HCM Average Control Delay	21.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	70.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	138	4	1	692	342	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1518			1630	1557	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1518			1629	1557	
Peak-hour factor, PHF	0.85	0.85	0.97	0.97	0.85	0.85
Adj. Flow (vph)	162	5	1	713	402	122
RTOR Reduction (vph)	2	0	0	0	22	0
Lane Group Flow (vph)	165	0	0	714	502	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4			6		
Permitted Phases			2	2		
Actuated Green, G (s)	13.0			30.0	30.0	
Effective Green, g (s)	13.0			30.0	30.0	
Actuated g/C Ratio	0.26			0.60	0.60	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	395			977	934	
v/s Ratio Prot	c0.11				0.32	
v/s Ratio Perm				c0.44		
v/c Ratio	0.42			0.73	0.54	
Uniform Delay, d1	15.4			7.1	5.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	3.2			4.8	2.2	
Delay (s)	18.6			11.9	8.1	
Level of Service	B			B	A	
Approach Delay (s)	18.6			11.9	8.1	
Approach LOS	B			B	A	

Intersection Summary				
HCM Average Control Delay	11.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

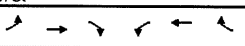
HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & 19th St 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	374	6	0	0	0	0	181	703	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3316	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3316	1548		
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92
Adj. Flow (vph)	0	416	7	0	0	0	0	199	773	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	423	0	0	0	0	0	199	773	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		18.5						20.0	45.0		
Effective Green, g (s)		18.6						20.0	41.5		
Actuated g/C Ratio		0.41						0.44	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		636						1475	1428		
v/s Ratio Prot		c0.27						0.06			
v/s Ratio Perm									c0.50		
v/c Ratio		0.67						0.13	0.54		
Uniform Delay, d1		10.7						7.4	0.3		
Progression Factor		1.00						1.06	1.00		
Incremental Delay, d2		5.4						0.2	1.3		
Delay (s)		16.2						8.0	1.6		
Level of Service		B						A	A		
Approach Delay (s)	16.2				0.0			2.9		0.0	
Approach LOS	B				A			A		A	

Intersection Summary				
HCM Average Control Delay	6.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	46.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	25	101	0	0	0	0	0	0	46	341	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2758									4795	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2758									4795	
Peak-hour factor, PHF	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Adj. Flow (vph)	0	33	135	0	0	0	0	0	0	57	421	0
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	77	0	0	0	0	0	0	0	0	451	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		889									2557	
v/s Ratio Prot		c0.03										
v/s Ratio Perm											0.09	
v/c Ratio		0.09									0.18	
Uniform Delay, d1		10.6									5.4	
Progression Factor		1.00									1.10	
Incremental Delay, d2		0.2									0.1	
Delay (s)		10.8									6.1	
Level of Service		B									A	
Approach Delay (s)		10.8			0.0				0.0		6.1	
Approach LOS		B			A				A		A	

Intersection Summary				
HCM Average Control Delay	7.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.14			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	43.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑					↰	↑↑↑	
Volume (vph)	0	135	85	70	652	0	0	0	0	191	280	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		2999			3238					1265	3121	
Flt Permitted		1.00			0.90					0.95	0.99	
Satd. Flow (perm)		2999			2940					1265	3121	
Peak-hour factor, PHF	0.96	0.96	0.96	0.82	0.82	0.82	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	141	89	85	795	0	0	0	0	205	301	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	183	0	0	880	0	0	0	0	164	342	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1400			1372					478	1179	
v/s Ratio Prot		0.06										
v/s Ratio Perm					c0.30					c0.13	0.11	
v/c Ratio		0.13			0.64					0.34	0.29	
Uniform Delay, d1		6.8			9.1					10.0	9.8	
Progression Factor		1.00			0.79					1.95	1.95	
Incremental Delay, d2		0.2			2.2					1.9	0.6	
Delay (s)		7.0			9.5					21.5	19.7	
Level of Service		A			A					C	B	
Approach Delay (s)		7.0			9.5			0.0			20.3	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	12.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	56.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↱		↑↑↑				
Volume (vph)	52	295	0	0	655	508	127	435	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.84		1.00				
Flpb, ped/bikes		0.99			1.00	1.00		0.97				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		0.99			1.00	1.00		0.99				
Satd. Flow (prot)		3162			3471	1332		4573				
Flt Permitted		0.79			1.00	1.00		0.99				
Satd. Flow (perm)		2523			3471	1332		4573				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	56	317	0	0	689	535	138	473	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	15	0	6	0	0	0	0
Lane Group Flow (vph)	0	373	0	0	689	520	0	632	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		64.3			64.3	64.3		17.2				
Effective Green, g (s)		64.3			64.3	64.3		17.2				
Actuated g/C Ratio		0.71			0.71	0.71		0.19				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1803			2480	952		874				
v/s Ratio Prot					0.20							
v/s Ratio Perm		0.15				c0.39		0.14				
v/c Ratio		0.21			0.28	0.55		0.72				
Uniform Delay, d1		4.3			4.6	6.0		34.2				
Progression Factor		0.75			1.21	1.16		0.71				
Incremental Delay, d2		0.3			0.3	2.2		2.5				
Delay (s)		3.5			5.8	9.2		26.8				
Level of Service		A			A	A		C				
Approach Delay (s)		3.5			7.3			26.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	12.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	76.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	408	82	0	0	0	0	0	0	78	282	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5939									4714	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5939									4714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	443	89	0	0	0	0	0	0	85	307	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	485	0	0	0	0	0	0	0	0	339	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2772									1781	
v/s Ratio Prot		c0.08										
v/s Ratio Perm											0.07	
v/c Ratio		0.17									0.19	
Uniform Delay, d1		7.0									9.4	
Progression Factor		1.00									1.53	
Incremental Delay, d2		0.1									0.2	
Delay (s)		7.1									14.6	
Level of Service		A									B	
Approach Delay (s)		7.1			0.0			0.0			14.6	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	10.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.18			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑						↑↑↑	↱			
Volume (vph)	41	314	0	0	0	0	0	591	160	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.92			
Flpb, ped/bikes	0.98	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1512	4873						4831	1450			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1512	4873						4831	1450			
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	54	413	0	0	0	0	0	664	180	0	0	0
RTOR Reduction (vph)	31	0	0	0	0	0	0	0	104	0	0	0
Lane Group Flow (vph)	23	413	0	0	0	0	0	664	76	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	655	2112						2040	612			
v/s Ratio Prot		c0.08						c0.14				
v/s Ratio Perm	0.02								0.05			
v/c Ratio	0.04	0.20						0.33	0.12			
Uniform Delay, d1	7.3	7.9						8.7	7.9			
Progression Factor	1.11	0.80						2.00	4.97			
Incremental Delay, d2	0.1	0.2						0.4	0.4			
Delay (s)	8.3	6.5						17.8	39.8			
Level of Service	A	A						B	D			
Approach Delay (s)		6.7			0.0			22.5			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	16.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	49.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	378	1217	0	0	0	0	0	358	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.97	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5917						4623	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5917						4623	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	420	1352	0	0	0	0	0	411	88
RTOR Reduction (vph)	0	0	0	0	124	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	1648	0	0	0	0	0	496	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					6						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2761						1746	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.28							
v/c Ratio					0.60						0.28	
Uniform Delay, d1					8.9						9.8	
Progression Factor					0.22						1.52	
Incremental Delay, d2					0.6						0.4	
Delay (s)					2.6						15.2	
Level of Service					A						B	
Approach Delay (s)		0.0			2.6			0.0			15.2	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	5.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	42.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	1438	76	165	650	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4648			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4648			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1546	84	199	699	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1617	0	0	894	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1962			2305				
v/s Ratio Prot					c0.35							
v/s Ratio Perm								c0.15				
v/c Ratio					0.82			0.39				
Uniform Delay, d1					11.5			9.9				
Progression Factor					1.00			1.71				
Incremental Delay, d2					4.1			0.5				
Delay (s)					15.6			17.4				
Level of Service					B			B				
Approach Delay (s)		0.0			15.6			17.4			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	49.5%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St
5/23/2007

Movement	SBL	SBT	SER	SET	SER
Lane Configurations		↰↑↑↑	↰	↑↑↑↱	
Volume (vph)	56	652	26	292	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.98	
Flpb, ped/bikes		0.99	1.00	1.00	
Frt		1.00	1.00	0.97	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4787	1548	4483	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4787	1548	4483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	709	28	317	96
RTOR Reduction (vph)	0	0	0	54	0
Lane Group Flow (vph)	0	772	28	359	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1808	619	1793	
v/s Ratio Prot			0.02	c0.08	
v/s Ratio Perm		0.16			
v/c Ratio		0.43	0.05	0.20	
Uniform Delay, d1		10.4	8.2	8.8	
Progression Factor		1.27	1.00	1.00	
Incremental Delay, d2		0.7	0.1	0.3	
Delay (s)		13.9	8.4	9.1	
Level of Service		B	A	A	
Approach Delay (s)		13.9		9.0	
Approach LOS		B		A	

Intersection Summary				
HCM Average Control Delay	12.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	35.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑						↰↑↑↑	
Volume (vph)	0	0	0	84	302	0	0	0	0	98	694	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						0.99	
Satd. Flow (prot)					3194						4709	
Flt Permitted					0.99						0.99	
Satd. Flow (perm)					3194						4709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	91	328	0	0	0	0	107	754	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	0	419	0	0	0	0	0	907	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1136						2407	
v/s Ratio Prot												
v/s Ratio Perm					0.13						0.19	
v/c Ratio					0.37						0.38	
Uniform Delay, d1					10.8						6.7	
Progression Factor					1.01						0.30	
Incremental Delay, d2					0.9						0.4	
Delay (s)					11.7						2.4	
Level of Service					B						A	
Approach Delay (s)		0.0			11.7			0.0			2.4	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	5.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	35.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	0	0	844	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	36	0	0	959	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	310	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	94	100	100			
cM capacity (veh/h)	647	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	36	240	240	240	240
Volume Left	36	0	0	0	0
Volume Right	0	0	0	0	0
cSH	647	1700	1700	1700	1700
Volume to Capacity	0.06	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑			↑↑			↰↑↑↑↱				
Volume (vph)	6	56	0	0	212	78	104	706	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3281			1535			5971				
Flt Permitted		0.91			1.00			0.99				
Satd. Flow (perm)		3021			1535			5971				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	61	0	0	230	85	113	767	100	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	286	0	0	937	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1007			512			2919				
v/s Ratio Prot					c0.19							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.07			0.56			0.32				
Uniform Delay, d1		10.2			12.3			7.0				
Progression Factor		1.85			1.00			0.76				
Incremental Delay, d2		0.1			4.3			0.3				
Delay (s)		19.1			16.6			5.5				
Level of Service		B			B			A				
Approach Delay (s)		19.1			16.6			5.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.8	HCM Level of Service		A
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	146	513	0	0	0	0	0	826	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6025						4741	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6025						4741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	159	558	0	0	0	0	0	898	86
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	665	0	0	0	0	0	959	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10				0		10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2276						2212	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.43	
Uniform Delay, d1					9.8						8.0	
Progression Factor					1.21						0.81	
Incremental Delay, d2					0.3						0.6	
Delay (s)					12.2						7.1	
Level of Service					B						A	
Approach Delay (s)		0.0			12.2				0.0		7.1	
Approach LOS		A			B				A		A	

Intersection Summary				
HCM Average Control Delay	9.3	HCM Level of Service		A
HCM Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	34.5%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	472	86	185	990	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.98			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5959			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5959			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	513	93	201	1076	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	21	0	0	75	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	585	0	0	1202	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2384			2563				
v/s Ratio Prot					c0.10							
v/s Ratio Perm								0.20				
v/c Ratio					0.25			0.47				
Uniform Delay, d1					9.0			9.4				
Progression Factor					1.00			2.18				
Incremental Delay, d2					0.2			0.4				
Delay (s)					9.2			20.8				
Level of Service					A			C				
Approach Delay (s)		0.0			9.2			20.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service		B
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	38.8%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑↑	
Volume (vph)	0	591	356	0	0	0	0	0	0	236	745	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.94									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5676									4713	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5676									4713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	642	387	0	0	0	0	0	0	257	810	0
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	98	0
Lane Group Flow (vph)	0	988	0	0	0	0	0	0	0	0	969	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2523									1885	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.21	
v/c Ratio		0.39									0.51	
Uniform Delay, d1		8.4									10.2	
Progression Factor		1.00									2.30	
Incremental Delay, d2		0.5									0.9	
Delay (s)		8.9									24.4	
Level of Service		A									C	
Approach Delay (s)		8.9			0.0				0.0		24.4	
Approach LOS		A			A				A		C	

Intersection Summary				
HCM Average Control Delay	16.8	HCM Level of Service		B
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	42.5%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	675	0	0	0	0	0	1106	283	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6065						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6065						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	734	0	0	0	0	0	1202	308	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	58	0	0	0	0
Lane Group Flow (vph)	0	866	0	0	0	0	0	1452	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2426						1846				
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.14										
v/c Ratio		0.36						0.79				
Uniform Delay, d1		9.4						11.8				
Progression Factor		1.05						1.00				
Incremental Delay, d2		0.4						3.5				
Delay (s)		10.3						15.3				
Level of Service		B						B				
Approach Delay (s)		10.3			0.0			15.3			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
52: Lakeshore & 1st Ave #2 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	10	388	1682	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.92			1.00	1.00	0.69
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1553			3405	3406	1099
Flt Permitted	0.98			0.90	1.00	1.00
Satd. Flow (perm)	1553			3066	3406	1099
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	422	1828	11
RTOR Reduction (vph)	10	0	0	0	0	2
Lane Group Flow (vph)	12	0	0	433	1828	9
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	5.6			76.4	76.4	76.4
Effective Green, g (s)	5.6			76.4	76.4	76.4
Actuated g/C Ratio	0.06			0.85	0.85	0.85
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	97			2603	2891	933
v/s Ratio Prot	c0.01				c0.54	
v/s Ratio Perm				0.14		0.01
v/c Ratio	0.12			0.17	0.63	0.01
Uniform Delay, d1	39.9			1.2	2.2	1.0
Progression Factor	1.00			0.22	0.31	0.30
Incremental Delay, d2	0.2			0.0	0.8	0.0
Delay (s)	40.1			0.3	1.5	0.3
Level of Service	D			A	A	A
Approach Delay (s)	40.1			0.3	1.5	
Approach LOS	D			A	A	

Intersection Summary				
HCM Average Control Delay	1.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
53: 12th St #1#2 & Convention Ctr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	777	254	0	2420	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	0.95			1.00		0.81
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.96			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4501			4893		1304
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4501			4893		1304
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	845	276	0	2630	0	11
RTOR Reduction (vph)	33	0	0	0	0	10
Lane Group Flow (vph)	1088	0	0	2630	0	1
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	77.9			77.9		4.1
Effective Green, g (s)	77.9			77.9		4.1
Actuated g/C Ratio	0.87			0.87		0.05
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3896			4235		59
v/s Ratio Prot	0.24			c0.54		
v/s Ratio Perm						c0.00
v/c Ratio	0.28			0.62		0.01
Uniform Delay, d1	1.1			1.8		41.0
Progression Factor	0.57			0.87		1.00
Incremental Delay, d2	0.2			0.5		0.0
Delay (s)	0.8			2.1		41.0
Level of Service	A			A		D
Approach Delay (s)	0.8			2.1	41.0	
Approach LOS	A			A	D	

Intersection Summary				
HCM Average Control Delay	1.8	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	65.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	350	1416	1004	681	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	380	1539	1091	740	0
RTOR Reduction (vph)	0	17	0	0	0	0
Lane Group Flow (vph)	0	363	1539	1091	740	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		59.0	59.0	90.0	23.0	
Effective Green, g (s)		59.0	59.0	90.0	23.0	
Actuated g/C Ratio		0.66	0.66	1.00	0.26	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2277	2207	3254	1275	
v/s Ratio Prot		0.10	c0.46	0.34	c0.15	
v/s Ratio Perm						
v/c Ratio		0.16	0.70	0.34	0.58	
Uniform Delay, d1		6.0	9.8	0.0	29.3	
Progression Factor		1.00	0.71	1.00	0.87	
Incremental Delay, d2		0.0	0.6	0.2	1.9	
Delay (s)		6.0	7.6	0.2	27.3	
Level of Service		A	A	A	C	
Approach Delay (s)	6.0			4.5	27.3	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	9.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	75.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	361	0	1004	320	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.72		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		2614		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		2614		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	392	0	1091	348	0
RTOR Reduction (vph)	0	362	0	0	0	0
Lane Group Flow (vph)	0	30	0	1091	348	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		6.8		75.2	75.2	
Effective Green, g (s)		6.8		75.2	75.2	
Actuated g/C Ratio		0.08		0.84	0.84	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		198		2900	2719	
v/s Ratio Prot				c0.31	0.11	
v/s Ratio Perm		c0.01				
v/c Ratio		0.15		0.38	0.13	
Uniform Delay, d1		38.9		1.8	1.4	
Progression Factor		1.00		0.50	0.39	
Incremental Delay, d2		0.1		0.4	0.1	
Delay (s)		39.0		1.2	0.6	
Level of Service		D		A	A	
Approach Delay (s)	39.0			1.2	0.6	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	269	473	555	210	256	469	180	51	563	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.98	1.00	1.00	0.93	1.00	0.98			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1619	1441	1735	3539	1286	1610	2971			3516	1297
Flt Permitted		0.36	1.00	0.64	1.00	1.00	0.95	0.93			0.83	1.00
Satd. Flow (perm)		599	1441	1174	3539	1286	1610	2757			2924	1297
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	95	11	295	531	624	236	275	504	194	55	605	342
RTOR Reduction (vph)	0	11	186	0	0	115	0	38	0	0	0	40
Lane Group Flow (vph)	0	125	80	531	624	121	247	668	0	0	660	302
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		180	432	352	1062	386	242	1686			1186	526
v/s Ratio Prot					0.18		c0.15	0.06				
v/s Ratio Perm		0.21	0.06	c0.45		0.09		0.18			0.23	c0.23
v/c Ratio		0.69	0.18	1.51	0.59	0.31	1.02	0.41			0.56	0.57
Uniform Delay, d1		27.8	23.3	31.5	26.8	24.3	38.2	9.5			20.5	20.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.84	2.74			1.00	1.00
Incremental Delay, d2		19.8	0.9	243.1	2.4	2.1	59.4	0.6			1.9	4.5
Delay (s)		47.6	24.3	274.6	29.2	26.5	91.3	26.8			22.4	25.2
Level of Service		D	C	F	C	C	F	C			C	C
Approach Delay (s)		32.2			122.4			43.2			23.4	
Approach LOS		C			F			D			C	

Intersection Summary				
HCM Average Control Delay	66.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	103.7%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	553	339	0	0	0	0	477	568	425	794	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4487						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4467						3539	1296	1770	3318	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	302	614	377	0	0	0	0	502	598	478	892	0
RTOR Reduction (vph)	0	83	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1210	0	0	0	0	0	502	598	478	892	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1496						1003	1296	423	1880	
v/s Ratio Prot								0.14		c0.27		
v/s Ratio Perm		0.27							c0.46		0.27	
v/c Ratio		0.81						0.50	0.46	1.13	0.47	
Uniform Delay, d1		27.4						26.9	0.0	34.2	11.6	
Progression Factor		1.00						1.00	1.00	1.28	1.04	
Incremental Delay, d2		4.8						1.8	1.2	71.6	0.4	
Delay (s)		32.2						28.7	1.2	115.3	12.4	
Level of Service		C						C	A	F	B	
Approach Delay (s)		32.2			0.0			13.7			48.3	
Approach LOS		C			A			B			D	

Intersection Summary				
HCM Average Control Delay	32.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av

Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	136	128	974	688	204	1065
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0		4.0	5.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.98		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.93		0.94		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1667		3319		1770	3318
Flt Permitted	0.97		1.00		0.95	1.00
Satd. Flow (perm)	1667		3319		1770	3318
Peak-hour factor, PHF	0.81	0.81	0.95	0.95	0.83	0.83
Adj. Flow (vph)	168	158	1025	724	246	1283
RTOR Reduction (vph)	38	0	137	0	0	0
Lane Group Flow (vph)	288	0	1612	0	246	1283
Confl. Peds. (#/hr)		17				
Confl. Bikes (#/hr)		2				
Parking (#/hr)						5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	17.6		44.1		13.0	61.1
Effective Green, g (s)	17.6		44.1		13.0	61.1
Actuated g/C Ratio	0.20		0.50		0.15	0.70
Clearance Time (s)	4.0		5.0		4.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	335		1669		262	2312
v/s Ratio Prot	c0.17		c0.49		c0.14	0.39
v/s Ratio Perm						
v/c Ratio	0.86		0.97		0.94	0.55
Uniform Delay, d1	33.8		21.1		37.0	6.6
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	16.5		15.3		38.5	1.0
Delay (s)	52.3		36.3		75.4	7.5
Level of Service	D		D		E	A
Approach Delay (s)	52.3		36.3			18.5
Approach LOS	D		D			B

Intersection Summary				
HCM Average Control Delay	30.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	87.7	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	87.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	0	173	159	796	270	213	354	0	0	246	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.66			1.00	0.91	1.00	1.00			0.86	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	875			3510	1261	1770	3539			2675	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	875			3510	1261	1770	3539			2675	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	87	0	204	171	856	290	254	421	0	0	276	222
RTOR Reduction (vph)	0	193	0	0	0	118	0	0	0	0	136	0
Lane Group Flow (vph)	78	20	0	0	1027	172	254	421	0	0	362	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0			38.3	38.3	16.7	37.3			16.6	
Effective Green, g (s)	5.0	5.0			38.3	38.3	16.7	37.3			16.6	
Actuated g/C Ratio	0.05	0.05			0.42	0.42	0.18	0.40			0.18	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	91	46			1460	524	321	1433			482	
v/s Ratio Prot	c0.05	0.02			c0.29		c0.14	0.12			c0.14	
v/s Ratio Perm						0.14						
v/c Ratio	0.86	0.42			0.70	0.33	0.79	0.29			0.75	
Uniform Delay, d1	43.2	42.1			22.2	18.2	36.0	18.5			35.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	49.1	2.1			2.9	1.7	11.7	0.8			5.8	
Delay (s)	92.3	44.3			25.1	19.9	47.8	18.5			41.6	
Level of Service	F	D			C	B	D	B			D	
Approach Delay (s)		57.2			23.9			29.5			41.6	
Approach LOS		E			C			C			D	

Intersection Summary				
HCM Average Control Delay	31.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	84.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1169	153	0	0	0	0	332	650	479	194	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.91		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.98						0.89		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1411	4689						2704		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.10	1.00	
Satd. Flow (perm)	1411	4689						2704		180	3539	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	211	1244	163	0	0	0	0	349	895	544	220	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	190	1411	0	0	0	0	0	1240	0	544	220	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)						0		5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1459						1142		309	2084	
v/s Ratio Prot								0.46		c0.22	0.06	
v/s Ratio Perm	0.13	0.30								c0.81		
v/c Ratio	0.43	0.97						1.63dr		1.76	0.11	
Uniform Delay, d1	24.7	30.6						26.0		26.2	8.1	
Progression Factor	1.06	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.9	12.1						53.1		355.2	0.1	
Delay (s)	28.1	42.7						79.1		381.4	8.2	
Level of Service	C	D						E		F	A	
Approach Delay (s)		40.9			0.0			79.1			273.9	
Approach LOS		D			A			E			F	

Intersection Summary				
HCM Average Control Delay	103.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.46			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	100.8%	ICU Level of Service	G	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	493	399	179	462	233	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3073	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	3539	3073	
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.93	0.93
Adj. Flow (vph)	548	443	188	486	251	91
RTOR Reduction (vph)	0	260	0	0	62	0
Lane Group Flow (vph)	548	183	188	486	280	0
Confl. Peds. (#/hr)			44			44
Confl. Bikes (#/hr)						16
Parking (#/hr)					5	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	19.7	19.7	6.4	19.9	9.5	
Effective Green, g (s)	19.7	19.7	6.4	19.9	9.5	
Actuated g/C Ratio	0.41	0.41	0.13	0.42	0.20	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	733	655	238	1480	613	
v/s Ratio Prot	c0.31		c0.11	0.14	c0.09	
v/s Ratio Perm		0.12				
v/c Ratio	0.75	0.28	0.79	0.33	0.46	
Uniform Delay, d1	11.8	9.2	19.9	9.3	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.7	0.1	14.8	0.0	0.2	
Delay (s)	15.5	9.3	34.7	9.4	17.0	
Level of Service	B	A	C	A	B	
Approach Delay (s)	12.7			16.5	17.0	
Approach LOS	B			B	B	

Intersection Summary				
HCM Average Control Delay	14.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av

Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	645	0	0	643
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.95	0.95
Adj. Flow (vph)	0	0	709	0	0	677
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	709	0	0	677
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.43			0.42
v/s Ratio Perm						
v/c Ratio			0.52			0.49
Uniform Delay, d1			2.6			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.1
Delay (s)			2.7			2.6
Level of Service			A			A
Approach Delay (s)	0.0		2.7			2.6
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	37.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av

Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	29	113	676	73	59	544
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.87		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1251		1577		1770	1863
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1251		1577		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	123	626	79	64	591
RTOR Reduction (vph)	107	0	7	0	0	0
Lane Group Flow (vph)	48	0	698	0	64	591
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.4		23.2		1.8	29.0
Effective Green, g (s)	5.4		23.2		1.8	29.0
Actuated g/C Ratio	0.13		0.57		0.04	0.72
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	167		906		79	1337
v/s Ratio Prot	c0.04		c0.44		c0.04	0.32
v/s Ratio Perm						
v/c Ratio	0.29		0.77		0.81	0.44
Uniform Delay, d1	15.8		6.6		19.1	2.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		3.7		42.7	0.1
Delay (s)	16.1		10.3		61.8	2.4
Level of Service	B		B		E	A
Approach Delay (s)	16.1		10.3			8.2
Approach LOS	B		B			A

Intersection Summary				
HCM Average Control Delay	10.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	40.4	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	61.1%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	24	645	0	12	643
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.91	0.91	0.94	0.94
Hourly flow rate (vph)	2	42	709	0	13	684
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	44	709	13	684
Volume Left	2	0	13	0
Volume Right	42	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

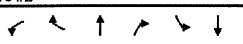
HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	4	600	10	20	634
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.50	0.90	0.90	0.88	0.88
Hourly flow rate (vph)	10	8	667	11	23	720
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.78	0.72			0.72	
vC, conflicting volume	1455	685			689	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1122	375			380	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			97	
cM capacity (veh/h)	170	481			846	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	678	23	720
Volume Left	10	0	23	0
Volume Right	8	11	0	0
cSH	239	1700	846	1700
Volume to Capacity	0.08	0.40	0.03	0.42
Queue Length 95th (ft)	6	0	2	0
Control Delay (s)	21.3	0.0	9.4	0.0
Lane LOS	C		A	
Approach Delay (s)	21.3	0.0	0.3	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 — Measure DD

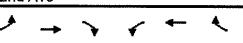


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	22	1132	11	0	1200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	1230	12	0	1304
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.85	0.88			0.88	
vC, conflicting volume	1959	761			1312	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1135	450			1078	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	157	433			531	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	820	422	652	652
Volume Left	0	0	0	0	0
Volume Right	24	0	12	0	0
cSH	433	1700	1700	1700	1700
Volume to Capacity	0.06	0.48	0.25	0.38	0.38
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	13.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave — Measure DD



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	25	249	12	53	131	0	0	16	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	28	283	14	60	149	0	0	20	35
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	298			15			294	369	15	422	363	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298			15			294	369	15	422	363	184
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	72	100	100	96	96
cM capacity (veh/h)	1260			1581			570	541	1047	397	546	826

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	170	155	209	56
Volume Left	28	0	60	0
Volume Right	0	14	0	35
cSH	1581	1700	549	696
Volume to Capacity	0.02	0.09	0.38	0.08
Queue Length 95th (ft)	1	0	44	7
Control Delay (s)	1.3	0.0	15.5	10.6
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.5	10.6
Approach LOS			C	B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	29	61	597	88	129	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.94		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.98		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1365		1585		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1365		1585		1770	1630
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91
Adj. Flow (vph)	32	68	642	95	142	609
RTOR Reduction (vph)	51	0	7	0	0	0
Lane Group Flow (vph)	49	0	730	0	142	609
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		42.0		7.0	53.0
Effective Green, g (s)	20.0		42.0		7.0	53.0
Actuated g/C Ratio	0.25		0.52		0.09	0.66
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	341		832		155	1080
v/s Ratio Prot	c0.04		c0.46		c0.08	0.37
v/s Ratio Perm						
v/c Ratio	0.14		0.88		0.92	0.56
Uniform Delay, d1	23.3		16.7		36.2	7.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.9		12.6		52.8	2.1
Delay (s)	24.2		29.4		89.1	9.4
Level of Service	C		C		F	A
Approach Delay (s)	24.2		29.4			24.5
Approach LOS	C		C			C

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	469	43	532	652	135	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3360		2954		1770	3539
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3360		2954		1770	3539
Peak-hour factor, PHF	0.90	0.90	0.88	0.88	0.91	0.91
Adj. Flow (vph)	521	48	605	741	148	585
RTOR Reduction (vph)	13	0	296	0	0	0
Lane Group Flow (vph)	556	0	1050	0	148	585
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	14.2		25.2		6.1	34.3
Effective Green, g (s)	14.2		25.2		6.1	34.3
Actuated g/C Ratio	0.26		0.46		0.11	0.63
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	875		1366		198	2227
v/s Ratio Prot	c0.17		c0.36		c0.08	
v/s Ratio Perm						0.17
v/c Ratio	0.64		0.77		0.75	0.26
Uniform Delay, d1	17.9		12.2		23.5	4.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.1		4.2		12.6	0.0
Delay (s)	19.0		16.4		36.0	4.5
Level of Service	B		B		D	A
Approach Delay (s)	19.0		16.4			10.9
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Foothill Blvd #2 & Lakeshore Av #2 — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	199	113	1118	0	0	1001
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3164		3235			3235
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3164		3235			3235
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	214	122	1202	0	0	1088
RTOR Reduction (vph)	48	0	0	0	0	0
Lane Group Flow (vph)	288	0	1202	0	0	1088
Confl. Peds. (#/hr)		42				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Parking (#/hr)			0			0
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	18.5		35.0			35.0
Effective Green, g (s)	18.5		35.0			35.0
Actuated g/C Ratio	0.31		0.58			0.58
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	976		1887			1887
v/s Ratio Prot	c0.09		c0.37			0.34
v/s Ratio Perm						
v/c Ratio	0.29		0.64			0.58
Uniform Delay, d1	15.8		8.3			7.8
Progression Factor	1.00		0.43			1.00
Incremental Delay, d2	0.8		1.5			1.3
Delay (s)	16.6		5.1			9.1
Level of Service	B		A			A
Approach Delay (s)	16.6		5.1			9.1
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1138	219	232	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3303			3395
Flt Permitted			1.00			0.52
Satd. Flow (perm)			3303			1777
Peak-hour factor, PHF	0.92	0.92	0.86	0.86	0.92	0.92
Adj. Flow (vph)	0	0	1323	255	252	1082
RTOR Reduction (vph)	0	0	10	0	0	0
Lane Group Flow (vph)	0	0	1568	0	0	1334
Confl. Peds. (#/hr)				26	70	
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type					pm+pt	
Protected Phases			2		14	6
Permitted Phases					6	
Actuated Green, G (s)			47.5			52.0
Effective Green, g (s)			47.5			52.0
Actuated g/C Ratio			0.79			0.87
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2615			1661
v/s Ratio Prot			0.47			c0.06
v/s Ratio Perm						c0.64
v/c Ratio			0.60			0.80
Uniform Delay, d1			2.5			1.8
Progression Factor			0.36			6.77
Incremental Delay, d2			0.9			2.5
Delay (s)			1.8			14.4
Level of Service			A			B
Approach Delay (s)	0.0		1.8			14.4
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 — Measure DD

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	267	71	1261	572	10	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.98		1.00	0.94		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3233		3406	2574		3405
Flt Permitted	0.96		1.00	1.00		0.94
Satd. Flow (perm)	3233		3406	2574		3200
Peak-hour factor, PHF	0.90	0.90	0.91	0.91	0.92	0.92
Adj. Flow (vph)	297	79	1386	629	11	1082
RTOR Reduction (vph)	13	0	0	220	0	0
Lane Group Flow (vph)	363	0	1386	409	0	1093
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	13.0		39.0	39.0		39.0
Effective Green, g (s)	13.0		39.0	39.0		39.0
Actuated g/C Ratio	0.22		0.65	0.65		0.65
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	700		2214	1673		2080
v/s Ratio Prot	c0.11		c0.41			
v/s Ratio Perm				0.16		0.34
v/c Ratio	0.52		0.63	0.24		0.53
Uniform Delay, d1	20.7		6.2	4.4		5.6
Progression Factor	1.00		1.00	1.00		0.96
Incremental Delay, d2	0.3		1.4	0.3		0.6
Delay (s)	21.0		7.5	4.7		6.0
Level of Service	C		A	A		A
Approach Delay (s)	21.0		6.7			6.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Driveway & 1st Ave #1#2 — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	0	20	151	0	6	0	1546	934	5	1262	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.93		1.00	0.98			0.95		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.98			0.94		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1576		3221	1373			5429		1765	4887	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1576		3221	1373			5429		1765	4887	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	0	22	164	0	7	0	1680	1015	5	1372	5
RTOR Reduction (vph)	0	21	0	0	4	0	0	50	0	0	0	0
Lane Group Flow (vph)	0	23	0	115	52	0	0	2645	0	5	1377	0
Confl. Peds. (#/hr)	70		70	70		70			70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split							Prot	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		6.8		10.4	10.4			69.1		0.6	73.7	
Effective Green, g (s)		6.8		10.4	10.4			69.1		0.6	73.7	
Actuated g/C Ratio		0.07		0.10	0.10			0.67		0.01	0.72	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		104		326	139			3646		10	3500	
v/s Ratio Prot		c0.01		0.04	c0.04			c0.49		0.00	c0.28	
v/s Ratio Perm												
v/c Ratio		0.23		0.35	0.37			1.04dr		0.50	0.39	
Uniform Delay, d1		45.6		43.1	43.2			10.8		51.0	5.8	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.4		0.2	0.6			1.3		13.6	0.0	
Delay (s)		46.0		43.4	43.8			12.1		64.6	5.8	
Level of Service		D		D	D			B		E	A	
Approach Delay (s)		46.0			43.5			12.1			6.0	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	102.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	71	432	56	47	134	8	145	237	56	6	34	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.97			1.00	
Frt		0.98			0.99			0.98			0.94	
Flt Protected		0.99			0.99			0.98			1.00	
Satd. Flow (prot)		3155			3183			1511			1445	
Flt Permitted		0.88			0.73			0.87			0.97	
Satd. Flow (perm)		2802			2363			1338			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	470	61	51	146	9	158	258	61	7	37	36
RTOR Reduction (vph)	0	24	0	0	6	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	584	0	0	200	0	0	474	0	0	67	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		23.6			23.6			50.4			50.4	
Effective Green, g (s)		23.6			23.6			50.4			50.4	
Actuated g/C Ratio		0.30			0.30			0.63			0.63	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		827			697			843			888	
v/s Ratio Prot												
v/s Ratio Perm		c0.21			0.08			c0.35			0.05	
v/c Ratio		0.71			0.29			0.56			0.08	
Uniform Delay, d1		25.1			21.7			8.5			5.7	
Progression Factor		1.00			1.00			1.00			1.10	
Incremental Delay, d2		2.3			0.1			2.7			0.2	
Delay (s)		27.4			21.8			11.2			6.5	
Level of Service		C			C			B			A	
Approach Delay (s)		27.4			21.8			11.2			6.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: E. 12TH & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	374	750	10	20	131	67	6	62	8	106	61	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		1.00			0.92			0.98			1.00	0.86
Flpb, ped/bikes		0.95			1.00			0.99			0.93	1.00
Frt		1.00			0.95			0.99			1.00	0.85
Flt Protected		0.98			1.00			1.00			0.97	1.00
Satd. Flow (prot)		3079			3098			1563			1687	1362
Flt Permitted		0.75			0.84			0.97			0.79	1.00
Satd. Flow (perm)		2360			2605			1525			1366	1362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	815	11	22	142	73	7	67	9	115	66	22
RTOR Reduction (vph)	0	1	0	0	25	0	0	5	0	0	0	15
Lane Group Flow (vph)	0	1232	0	0	212	0	0	78	0	0	181	7
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5			5			5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6		8				4	
Permitted Phases	2			6				8		4		4
Actuated Green, G (s)		59.5			59.5			21.0			21.0	21.0
Effective Green, g (s)		59.5			59.5			21.0			21.0	21.0
Actuated g/C Ratio		0.66			0.66			0.23			0.23	0.23
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1560			1722			356			319	318
v/s Ratio Prot												
v/s Ratio Perm		c0.52			0.08			0.05			c0.13	0.01
v/c Ratio		0.79			0.12			0.22			0.57	0.02
Uniform Delay, d1		10.8			5.6			27.9			30.5	26.6
Progression Factor		1.00			1.00			1.02			1.00	1.00
Incremental Delay, d2		4.2			0.1			1.4			7.1	0.1
Delay (s)		15.0			5.8			29.8			37.6	26.7
Level of Service		B			A			C			D	C
Approach Delay (s)		15.0			5.8			29.8			36.4	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	26	401	30	0	0	0	0	207	12	7	32	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	31	441	33	0	0	0	0	262	15	9	40	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked					0.93			0.93	0.93	0.93	0.93	
vC, conflicting volume	4				460			544	529	248	437	545	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4				275			345	328	25	229	346	4
tC, single (s)	4.1				4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)													
tF (s)	2.2				2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100			100	51	98	98	92	100
cM capacity (veh/h)	1611				1182			496	530	962	384	518	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	251	253	277	48
Volume Left	31	0	0	9
Volume Right	0	33	15	0
cSH	1611	1700	543	488
Volume to Capacity	0.02	0.15	0.51	0.10
Queue Length 95th (ft)	1	0	72	8
Control Delay (s)	1.0	0.0	18.3	13.2
Lane LOS	A		C	B
Approach Delay (s)	0.5		18.3	13.2
Approach LOS			C	B

Intersection Summary				
Average Delay	7.2			
Intersection Capacity Utilization	31.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave — Measure DD

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		Y	
Volume (veh/h)	48	268	188	36	40	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	291	204	39	43	35
Pedestrians		70	70			
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	313				760	384
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				760	364
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	94
cM capacity (veh/h)	1174				317	604

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	343	243	78
Volume Left	52	0	43
Volume Right	0	39	35
cSH	1174	1700	402
Volume to Capacity	0.04	0.14	0.19
Queue Length 95th (ft)	3	0	18
Control Delay (s)	1.6	0.0	16.1
Lane LOS	A		C
Approach Delay (s)	1.6	0.0	16.1
Approach LOS			C

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↱		↔			↔	↱
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	430	2	2	184	381	1	2	1	314	2	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	467	2	2	200	414	1	2	1	341	2	49

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	513	202	414	4	343	49
Volume Left (vph)	43	2	0	1	341	0
Volume Right (vph)	2	0	414	1	0	49
Hadj (s)	0.05	0.04	-0.67	-0.07	0.53	-0.67
Departure Headway (s)	7.0	7.2	6.5	9.3	8.1	6.9
Degree Utilization, x	1.00	0.41	0.75	0.01	0.77	0.09
Capacity (veh/h)	506	499	552	353	343	513
Control Delay (s)	67.4	13.9	25.0	12.4	32.7	9.4
Approach Delay (s)	67.4	21.4		12.4	29.8	
Approach LOS	F	C		B	D	

Intersection Summary				
Delay	39.0			
HCM Level of Service	E			
Intersection Capacity Utilization	75.9%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr — Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↰			↑↑		
Volume (veh/h)	97	0	0	807	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	116	0	0	887	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	513	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	100	100			
cM capacity (veh/h)	490	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	58	58	443	443
Volume Left	58	58	0	0
Volume Right	0	0	0	0
cSH	490	490	1700	1700
Volume to Capacity	0.12	0.12	0.26	0.26
Queue Length 95th (ft)	10	10	0	0
Control Delay (s)	13.3	13.3	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.3		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	46	278	44	38	261	0	0	134	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3202			1652			1642	
Flt Permitted					0.99			0.95			1.00	
Satd. Flow (perm)					3202			1587			1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	50	302	48	41	284	0	0	146	14
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	384	0	0	325	0	0	155	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1330			769			796	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.12			c0.20				
v/c Ratio					0.29			0.42			0.19	
Uniform Delay, d1					12.6			10.9			9.5	
Progression Factor					1.00			1.27			1.00	
Incremental Delay, d2					0.5			1.5			0.5	
Delay (s)					13.2			15.2			10.1	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.2			15.2			10.1	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	62.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	436	36	28	483	46	63	227	45	37	189	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3288			3277			1607			1636	
Flt Permitted		0.93			0.92			0.90			0.91	
Satd. Flow (perm)		3049			3017			1454			1502	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	474	39	30	525	50	68	247	49	40	205	17
RTOR Reduction (vph)	0	9	0	0	10	0	0	9	0	0	4	0
Lane Group Flow (vph)	0	526	0	0	595	0	0	355	0	0	258	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1384			1369			626			647	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.20			c0.24			0.17	
v/c Ratio		0.38			0.43			0.57			0.40	
Uniform Delay, d1		11.7			12.1			13.9			12.7	
Progression Factor		1.00			1.00			0.95			0.79	
Incremental Delay, d2		0.8			1.0			2.6			1.8	
Delay (s)		12.5			13.1			15.8			11.8	
Level of Service		B			B			B			B	
Approach Delay (s)		12.5			13.1			15.8			11.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	67.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	569	71	25	371	63	54	287	99	46	180	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3267			3236			1582			1618	
Flt Permitted		0.93			0.90			0.93			0.88	
Satd. Flow (perm)		3051			2932			1483			1434	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	640	77	27	403	68	59	312	108	50	196	30
RTOR Reduction (vph)	0	14	0	0	19	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	728	0	0	479	0	0	463	0	0	269	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1549			1489			570			552	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.16			c0.31			0.19	
v/c Ratio		0.47			0.32			0.81			0.49	
Uniform Delay, d1		10.3			9.4			17.9			15.1	
Progression Factor		1.00			1.00			0.80			0.72	
Incremental Delay, d2		1.0			0.6			10.7			2.9	
Delay (s)		11.4			10.0			25.1			13.8	
Level of Service		B			A			C			B	
Approach Delay (s)		11.4			10.0			25.1			13.8	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	14.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	73.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	691	143	35	211	26	55	303	61	34	231	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.91		0.98	
Flpb, ped/bikes	0.94	1.00		0.98	1.00			0.99	1.00		1.00	
Frt	1.00	0.97		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1661	4690		1729	4773			1655	1448		1696	
Flt Permitted	0.59	1.00		0.25	1.00			0.91	1.00		0.94	
Satd. Flow (perm)	1025	4690		463	4773			1511	1448		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	740	155	38	229	28	60	329	66	37	251	64
RTOR Reduction (vph)	0	50	0	0	16	0	0	0	36	0	12	0
Lane Group Flow (vph)	192	845	0	38	241	0	0	389	30	0	340	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	442	2020		199	2056			697	668		696	
v/s Ratio Prot		0.18			0.05							
v/s Ratio Perm	c0.19			0.08				c0.26	0.02		0.23	
v/c Ratio	0.43	0.42		0.19	0.12			0.56	0.05		0.49	
Uniform Delay, d1	13.0	12.8		11.5	11.1			12.7	9.6		12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.69	
Incremental Delay, d2	3.1	0.6		2.1	0.1			3.2	0.1		2.3	
Delay (s)	16.0	13.5		13.6	11.2			15.9	9.8		10.7	
Level of Service	B	B		B	B			B	A		B	
Approach Delay (s)		13.9			11.5			15.0			10.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St — Measure DD

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	9	222	1056	67	144	446	49	75	179	304	141	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.91		
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.95		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3283		1757	3054			1544	2754		
Flt Permitted		0.95	1.00		0.23	1.00			0.54	0.93		
Satd. Flow (perm)		3433	3283		430	3054			872	2576		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	241	1148	62	157	485	53	82	195	330	153	17
RTOR Reduction (vph)	0	0	4	0	0	13	0	0	0	3	0	0
Lane Group Flow (vph)	0	251	1206	0	157	607	0	0	175	517	0	0
Confl. Peds. (#/hr)		70		70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Perm				Perm			
Protected Phases	5	5	2			6				4		
Permitted Phases					6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		725	1860		129	916			281	830		
v/s Ratio Prot		0.07	c0.37			0.20						
v/s Ratio Perm					c0.37				0.20	c0.20		
v/c Ratio		0.35	0.65		1.22	0.66			0.62	0.62		
Uniform Delay, d1		30.2	13.4		31.5	27.5			25.9	25.9		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		1.3	1.8		149.0	3.8			10.0	3.5		
Delay (s)		31.5	15.1		180.5	31.3			35.8	29.4		
Level of Service		C	B		F	C			D	C		
Approach Delay (s)			17.9			61.4				31.0		
Approach LOS			B			E				C		

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St — Measure DD

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	35	15	125	116
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.98	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3136	
Flt Permitted			0.77	
Satd. Flow (perm)			2438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	16	136	126
RTOR Reduction (vph)	0	0	35	0
Lane Group Flow (vph)	0	0	281	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			786	
v/s Ratio Prot				
v/s Ratio Perm			0.12	
v/c Ratio			0.36	
Uniform Delay, d1			23.4	
Progression Factor			1.00	
Incremental Delay, d2			1.3	
Delay (s)			24.6	
Level of Service			C	
Approach Delay (s)			24.6	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	474	149	246	330	30	0	1246	724	0	575	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3280		3400	3440			5036	1479		4696	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3280		3400	3440			5036	1479		4696	
Peak-hour factor, PHF	0.85	0.85	0.85	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88
Adj. Flow (vph)	152	558	175	293	393	36	0	1342	778	0	653	88
RTOR Reduction (vph)	0	34	0	0	7	0	0	0	388	0	18	0
Lane Group Flow (vph)	152	699	0	293	422	0	0	1342	390	0	723	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Effective Green, g (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.09	0.26		0.27	0.45			0.29	0.29		0.29	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	323	858		932	1558			1483	435		1383	
v/s Ratio Prot	0.04	c0.21		c0.09	0.12			c0.27			0.15	
v/s Ratio Perm									0.26			
v/c Ratio	0.47	0.81		0.31	0.27			0.90	0.90		0.52	
Uniform Delay, d1	37.9	30.6		25.5	15.1			30.0	29.9		26.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	5.7		0.1	0.4			8.0	20.1		0.2	
Delay (s)	38.3	36.3		25.5	15.5			37.9	49.9		26.1	
Level of Service	D	D		C	B			D	D		C	
Approach Delay (s)		36.6			19.6			42.3			26.1	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	15.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
32: 20th St #3 & Lakeside Dr — Measure DD

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	921	170	583	429	100	850
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.98		1.00	1.00	0.92	0.90
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.88	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4719		3367	4893	2878	1296
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4719		3367	4893	2878	1296
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1001	185	634	466	109	924
RTOR Reduction (vph)	45	0	0	0	339	339
Lane Group Flow (vph)	1141	0	634	466	232	123
Confl. Peds. (#/hr)		70	70		70	70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot		NBL	Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0		14.0	36.0	16.0	16.0
Effective Green, g (s)	18.0		14.0	36.0	16.0	16.0
Actuated g/C Ratio	0.30		0.23	0.60	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1416		786	2936	767	346
v/s Ratio Prot	c0.24		c0.19	0.10	0.08	
v/s Ratio Perm						c0.10
v/c Ratio	0.81		0.81	0.16	0.30	0.36
Uniform Delay, d1	19.4		21.7	5.3	17.6	17.8
Progression Factor	1.18		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4		8.7	0.1	1.0	2.8
Delay (s)	27.2		30.4	5.4	18.6	20.7
Level of Service	C		C	A	B	C
Approach Delay (s)	27.2			19.8	19.5	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway

Measure DD

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	413	37	136	300	93	119	33	0	678	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00	0.86			0.95	0.93	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.85			0.90	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.98	1.00	1.00	1.00
Satd. Flow (prot)	4810		1770	3406	1364			1499	1438	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.98	1.00	1.00	1.00
Satd. Flow (perm)	4810		1770	3406	1364			1499	1438	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	40	148	326	101	129	36	0	737	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	107	256	0	0
Lane Group Flow (vph)	489	0	148	326	101	0	0	353	186	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		7.0	20.0	20.0			24.0	24.0	4.0	60.0
Effective Green, g (s)	17.0		7.0	20.0	20.0			24.0	24.0	4.0	60.0
Actuated g/C Ratio	0.28		0.12	0.33	0.33			0.40	0.40	0.07	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	1363		207	1135	455			600	575	107	1611
v/s Ratio Prot	c0.10		c0.08	0.10				c0.24			0.02
v/s Ratio Perm					0.07				0.13		0.01
v/c Ratio	0.36		0.71	0.29	0.22			0.59	0.32	0.31	0.01
Uniform Delay, d1	17.2		25.5	14.7	14.4			14.1	12.4	26.7	0.0
Progression Factor	1.00		0.84	0.72	0.73			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7		18.8	0.6	1.1			4.2	1.5	7.3	0.0
Delay (s)	17.9		40.2	11.3	11.6			18.3	13.9	34.0	0.0
Level of Service	B		D	B	B			B	B	C	A
Approach Delay (s)	17.9			18.8				16.1			
Approach LOS	B			B				B			

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	224	7	3	650	630	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1517			1630	1555	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1517			1628	1555	
Peak-hour factor, PHF	0.75	0.75	0.91	0.91	0.95	0.95
Adj. Flow (vph)	299	9	3	714	663	173
RTOR Reduction (vph)	2	0	0	0	17	0
Lane Group Flow (vph)	306	0	0	717	819	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	14.0			34.0	34.0	
Effective Green, g (s)	14.0			34.0	34.0	
Actuated g/C Ratio	0.25			0.62	0.62	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	386			1005	961	
v/s Ratio Prot	c0.20				c0.53	
v/s Ratio Perm				0.44		
v/c Ratio	0.79			0.71	0.85	
Uniform Delay, d1	19.1			7.2	8.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	15.3			4.3	9.4	
Delay (s)	34.4			11.5	17.9	
Level of Service	C			B	B	
Approach Delay (s)	34.4			11.5	17.9	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & 19th St

Measure DD

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	591	11	0	0	0	0	106	660	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3316	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.84	0.84	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	704	13	0	0	0	0	113	702	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	717	0	0	0	0	0	113	702	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		33.5						20.0	60.0		
Effective Green, g (s)		33.5						20.0	56.5		
Actuated g/C Ratio		0.56						0.33	0.94		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		864						1106	1458		
v/s Ratio Prot		c0.46						0.03			
v/s Ratio Perm									c0.45		
v/c Ratio		0.83						0.10	0.48		
Uniform Delay, d1		10.9						13.8	0.2		
Progression Factor		1.00						0.64	1.00		
Incremental Delay, d2		9.1						0.2	1.1		
Delay (s)		20.0						9.0	1.3		
Level of Service		B						A	A		
Approach Delay (s)	20.0				0.0			2.4		0.0	
Approach LOS	B				A			A		A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	42	197	0	0	0	0	0	0	45	690	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2737									4814	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2737									4814	
Peak-hour factor, PHF	0.79	0.79	0.79	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	53	249	0	0	0	0	0	0	53	812	0
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	202	0	0	0	0	0	0	0	0	849	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			8									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		882									2567	
v/s Ratio Prot		c0.07										
v/s Ratio Perm											0.18	
v/c Ratio		0.23									0.33	
Uniform Delay, d1		11.2									5.9	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									0.3	
Delay (s)		11.8									6.3	
Level of Service		B									A	
Approach Delay (s)		11.8			0.0				0.0		6.3	
Approach LOS		B			A				A		A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	492	58	28	402	0	0	0	0	309	461	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.99	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3124			3241					1295	3103	
Flt Permitted		1.00			0.91					0.95	1.00	
Satd. Flow (perm)		3124			2944					1295	3103	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	553	65	34	484	0	0	0	0	336	501	35
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	598	0	0	518	0	0	0	0	286	576	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1458			1374					489	1172	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.18					c0.22	0.19	
v/c Ratio		0.41			0.38					0.58	0.49	
Uniform Delay, d1		7.9			7.8					11.2	10.7	
Progression Factor		1.00			1.00					1.71	1.77	
Incremental Delay, d2		0.9			0.8					4.9	1.4	
Delay (s)		8.8			8.6					23.9	20.4	
Level of Service		A			A					C	C	
Approach Delay (s)		8.8			8.6			0.0			21.5	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	14.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	749	0	0	280	313	106	406	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.99		1.00				
Flpb, ped/bikes		1.00			1.00	1.00		0.98				
Frt		1.00			1.00	0.85		1.00				
Flt Protected		1.00			1.00	1.00		0.99				
Satd. Flow (prot)		3174			3471	1425		4674				
Flt Permitted		0.88			1.00	1.00		0.99				
Satd. Flow (perm)		2817			3471	1425		4674				
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	85	814	0	0	318	356	120	461	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	6	0	0	0	0
Lane Group Flow (vph)	0	899	0	0	318	304	0	591	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		37.9			37.9	37.9		13.6				
Effective Green, g (s)		37.9			37.9	37.9		13.6				
Actuated g/C Ratio		0.63			0.63	0.63		0.23				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1779			2193	900		1059				
v/s Ratio Prot					0.09							
v/s Ratio Perm		c0.32				0.21		0.13				
v/c Ratio		0.51			0.15	0.34		0.56				
Uniform Delay, d1		6.0			4.5	5.2		20.5				
Progression Factor		1.00			0.84	1.31		1.00				
Incremental Delay, d2		1.0			0.1	1.0		0.4				
Delay (s)		7.0			3.9	7.7		20.9				
Level of Service		A			A	A		C				
Approach Delay (s)		7.0			5.9			20.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	77.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	614	162	0	0	0	0	0	0	96	620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5883									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5883									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	667	176	0	0	0	0	0	0	104	674	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	788	0	0	0	0	0	0	0	0	732	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2745									1798	
v/s Ratio Prot		c0.13										
v/s Ratio Perm											0.15	
v/c Ratio		0.29									0.41	
Uniform Delay, d1		7.4									10.3	
Progression Factor		1.00									1.53	
Incremental Delay, d2		0.3									0.6	
Delay (s)		7.7									16.4	
Level of Service		A									B	
Approach Delay (s)		7.7			0.0			0.0			16.4	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	11.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	608	0	0	0	0	0	465	291	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.93			
Flpb, ped/bikes	0.97	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1508	4873						4831	1474			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1508	4873						4831	1474			
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	81	707	0	0	0	0	0	505	316	0	0	0
RTOR Reduction (vph)	46	0	0	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	35	707	0	0	0	0	0	505	243	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	653	2112						2040	622			
v/s Ratio Prot		c0.15						0.10				
v/s Ratio Perm	0.02								c0.16			
v/c Ratio	0.05	0.33						0.25	0.39			
Uniform Delay, d1	7.4	8.5						8.4	9.0			
Progression Factor	0.94	0.85						2.22	3.03			
Incremental Delay, d2	0.2	0.4						0.3	1.7			
Delay (s)	7.1	7.6						18.9	28.9			
Level of Service	A	A						B	C			
Approach Delay (s)		7.6			0.0			22.6			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	62.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	234	719	0	0	0	0	0	550	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5899						4735	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5899						4735	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	257	790	0	0	0	0	0	618	58
RTOR Reduction (vph)	0	0	0	0	67	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	0	0	0	980	0	0	0	0	0	652	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					6						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1789	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.17							
v/c Ratio					0.36						0.36	
Uniform Delay, d1					7.7						10.1	
Progression Factor					0.26						1.72	
Incremental Delay, d2					0.3						0.5	
Delay (s)					2.3						17.9	
Level of Service					A						B	
Approach Delay (s)		0.0			2.3			0.0			17.9	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	8.4	HCM Level of Service		A
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	33.1%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	878	23	155	748	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					1.00			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4673			6032				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4673			6032				
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	976	26	167	804	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	30	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	996	0	0	941	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1973			2346				
v/s Ratio Prot					c0.21							
v/s Ratio Perm								c0.16				
v/c Ratio					0.50			0.40				
Uniform Delay, d1					9.5			10.0				
Progression Factor					1.00			1.72				
Incremental Delay, d2					0.9			0.5				
Delay (s)					10.5			17.6				
Level of Service					B			B				
Approach Delay (s)		0.0			10.5			17.6			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	14.0	HCM Level of Service		B
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St

Measure DD

Movement	SBL	SBT	SEL	SET	SER
Lane Configurations		↰↑↑↑	↰	↑↑↑↱	
Volume (vph)	52	774	42	958	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.98	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4796	1548	4580	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4796	1548	4580	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	841	46	1041	146
RTOR Reduction (vph)	0	0	0	33	0
Lane Group Flow (vph)	0	898	46	1154	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1832	
v/s Ratio Prot			0.03	c0.25	
v/s Ratio Perm		0.19			
v/c Ratio		0.50	0.07	0.63	
Uniform Delay, d1		10.7	8.3	10.8	
Progression Factor		1.07	1.00	1.00	
Incremental Delay, d2		0.9	0.2	1.7	
Delay (s)		12.4	8.6	12.5	
Level of Service		B	A	B	
Approach Delay (s)		12.4		12.3	
Approach LOS		B		B	

Intersection Summary				
HCM Average Control Delay	12.4	HCM Level of Service		B
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		10.0
Intersection Capacity Utilization	46.4%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↑↑↑↱	
Volume (vph)	0	0	0	86	192	0	0	0	0	86	802	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	93	209	0	0	0	0	93	872	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	302	0	0	0	0	0	1010	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.10						0.21	
v/c Ratio					0.27						0.42	
Uniform Delay, d1					10.3						6.8	
Progression Factor					1.03						0.30	
Incremental Delay, d2					0.5						0.5	
Delay (s)					11.1						2.6	
Level of Service					B						A	
Approach Delay (s)		0.0			11.1			0.0			2.6	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	4.5	HCM Level of Service		A
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	33.3%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	0	0	613	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	84	0	0	656	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	284	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	87	100	100			
cM capacity (veh/h)	672	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	84	214	214	214	214
Volume Left	84	0	0	0	0
Volume Right	0	0	0	0	0
cSH	672	1700	1700	1700	1700
Volume to Capacity	0.13	0.13	0.13	0.13	0.13
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	21.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	60	0	0	208	100	88	734	74	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.97			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.99				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		3310			1516			6006				
Flt Permitted		0.95			1.00			1.00				
Satd. Flow (perm)		3138			1516			6006				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	65	0	0	226	109	96	798	80	0	0	0
RTOR Reduction (vph)	0	0	0	0	39	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	67	0	0	296	0	0	942	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1046			505			2936				
v/s Ratio Prot					c0.20							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.06			0.59			0.32				
Uniform Delay, d1		10.2			12.4			7.0				
Progression Factor		1.88			1.00			0.89				
Incremental Delay, d2		0.1			4.9			0.3				
Delay (s)		19.3			17.4			6.5				
Level of Service		B			B			A				
Approach Delay (s)		19.3			17.4			6.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	43.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	125	431	0	0	0	0	0	909	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6023						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6023						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	136	468	0	0	0	0	0	988	117
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	564	0	0	0	0	0	1072	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10				0		10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2275						2204	
v/s Ratio Prot											c0.23	
v/s Ratio Perm					0.09							
v/c Ratio					0.25						0.49	
Uniform Delay, d1					9.6						8.3	
Progression Factor					1.12						0.78	
Incremental Delay, d2					0.3						0.7	
Delay (s)					11.0						7.2	
Level of Service					B						A	
Approach Delay (s)		0.0			11.0			0.0			7.2	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	380	93	177	752	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5902			6052				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5902			6052				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	413	101	192	817	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	50	0	0	94	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	464	0	0	915	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2361			2555				
v/s Ratio Prot					c0.08							
v/s Ratio Perm								0.15				
v/c Ratio					0.20			0.36				
Uniform Delay, d1					8.8			8.8				
Progression Factor					1.00			2.20				
Incremental Delay, d2					0.2			0.3				
Delay (s)					9.0			19.8				
Level of Service					A			B				
Approach Delay (s)		0.0			9.0			19.8			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	16.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1100	305	0	0	0	0	0	0	285	838	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5681									4707	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5681									4707	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1196	332	0	0	0	0	0	0	310	911	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	1500	0	0	0	0	0	0	0	0	1204	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2614									1883	
v/s Ratio Prot		c0.25										
v/s Ratio Perm											0.26	
v/c Ratio		0.57									0.64	
Uniform Delay, d1		9.3									10.9	
Progression Factor		1.00									2.03	
Incremental Delay, d2		0.9									1.5	
Delay (s)		10.2									23.7	
Level of Service		B									C	
Approach Delay (s)		10.2			0.0				0.0		23.7	
Approach LOS		B			A				A		C	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	50.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St

Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	1024	0	0	0	0	0	733	238	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.98				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6071						4572				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6071						4572				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	1113	0	0	0	0	0	797	259	0	0	0
RTOR Reduction (vph)	0	46	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1269	0	0	0	0	0	1041	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2428						1829				
v/s Ratio Prot								c0.23				
v/s Ratio Perm		0.21										
v/c Ratio		0.52						0.57				
Uniform Delay, d1		10.2						10.5				
Progression Factor		1.36						1.00				
Incremental Delay, d2		0.7						1.3				
Delay (s)		14.6						11.8				
Level of Service		B						B				
Approach Delay (s)		14.6			0.0			11.8			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	45.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Lakeshore & 1st Ave #2

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	10	1132	1190	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.94			1.00	1.00	0.79
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1588			3405	3406	1246
Flt Permitted	0.98			0.94	1.00	1.00
Satd. Flow (perm)	1588			3213	3406	1246
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	1230	1293	11
RTOR Reduction (vph)	10	0	0	0	0	2
Lane Group Flow (vph)	12	0	0	1241	1293	9
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	4.5			47.5	47.5	47.5
Effective Green, g (s)	4.5			47.5	47.5	47.5
Actuated g/C Ratio	0.08			0.79	0.79	0.79
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	119			2544	2696	986
v/s Ratio Prot	c0.01				0.38	
v/s Ratio Perm				c0.39		0.01
v/c Ratio	0.10			0.49	0.48	0.01
Uniform Delay, d1	25.9			2.1	2.1	1.3
Progression Factor	1.00			0.20	0.61	0.73
Incremental Delay, d2	0.1			0.0	0.5	0.0
Delay (s)	26.0			0.5	1.8	1.0
Level of Service	C			A	A	A
Approach Delay (s)	26.0			0.5	1.8	
Approach LOS	C			A	A	

Intersection Summary				
HCM Average Control Delay	1.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
53: 12th St #1#2 & Convention Ctr

Measure DD

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2391	10	0	1403	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	1.00			1.00		0.87
Flpb, ped/bikes	1.00			1.00		1.00
Frt	1.00			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4888			4893		1398
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4888			4893		1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2599	11	0	1525	0	11
RTOR Reduction (vph)	0	0	0	0	0	2
Lane Group Flow (vph)	2610	0	0	1525	0	9
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	47.7			47.7		4.3
Effective Green, g (s)	47.7			47.7		4.3
Actuated g/C Ratio	0.80			0.80		0.07
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3886			3890		100
v/s Ratio Prot	c0.53			0.31		
v/s Ratio Perm						c0.01
v/c Ratio	0.67			0.39		0.09
Uniform Delay, d1	2.7			1.8		26.0
Progression Factor	0.73			1.00		1.00
Incremental Delay, d2	0.7			0.3		0.1
Delay (s)	2.6			2.1		26.2
Level of Service	A			A		C
Approach Delay (s)	2.6			2.1	26.2	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	2.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	65.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1010	810	593	1391	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1098	880	645	1512	0
RTOR Reduction (vph)	0	15	0	0	0	0
Lane Group Flow (vph)	0	1083	880	645	1512	0
Confl. Peds. (#/hr)			70	70		
Confl. Bikes (#/hr)			16			
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		25.0	25.0	60.0	27.0	
Effective Green, g (s)		25.0	25.0	60.0	27.0	
Actuated g/C Ratio		0.42	0.42	1.00	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1448	1403	3254	2245	
v/s Ratio Prot		c0.31	0.26	0.20	c0.30	
v/s Ratio Perm						
v/c Ratio		0.75	0.63	0.20	0.67	
Uniform Delay, d1		14.8	13.8	0.0	13.0	
Progression Factor		1.00	0.83	1.00	0.85	
Incremental Delay, d2		1.9	0.6	0.1	1.5	
Delay (s)		16.7	12.1	0.1	12.6	
Level of Service		B	B	A	B	
Approach Delay (s)	16.7			7.0	12.6	
Approach LOS	B			A	B	

Intersection Summary				
HCM Average Control Delay	11.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	72.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St

Measure DD

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	752	0	593	639	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.83		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		3004		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		3004		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	817	0	645	695	0
RTOR Reduction (vph)	0	220	0	0	0	0
Lane Group Flow (vph)	0	598	0	645	695	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		16.1		35.9	35.9	
Effective Green, g (s)		16.1		35.9	35.9	
Actuated g/C Ratio		0.27		0.60	0.60	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		806		2077	1947	
v/s Ratio Prot				0.19	c0.21	
v/s Ratio Perm		c0.20				
v/c Ratio		0.74		0.31	0.36	
Uniform Delay, d1		20.0		5.9	6.2	
Progression Factor		1.00		0.61	0.68	
Incremental Delay, d2		3.2		0.4	0.4	
Delay (s)		23.3		4.0	4.6	
Level of Service		C		A	A	
Approach Delay (s)	23.3			4.0	4.6	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	0	58	326	1029	163	271	231	0	0	386	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.87			1.00	0.96	1.00	1.00			0.89	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.87			1.00	0.85	1.00	1.00			0.92	
Flt Protected	0.95	0.99			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1159			3497	1330	3433	1863			2699	
Flt Permitted	0.95	0.99			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1159			3497	1330	3433	1863			2699	
Peak-hour factor, PHF	0.86	0.86	0.86	0.96	0.96	0.96	0.78	0.78	0.78	0.94	0.94	0.94
Adj. Flow (vph)	80	0	67	340	1072	170	347	296	0	0	411	529
RTOR Reduction (vph)	0	64	0	0	0	52	0	0	0	0	79	0
Lane Group Flow (vph)	72	11	0	0	1412	118	347	296	0	0	861	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0			45.5	45.5	11.0	48.0			33.0	
Effective Green, g (s)	5.0	5.0			45.5	45.5	11.0	48.0			33.0	
Actuated g/C Ratio	0.05	0.05			0.41	0.41	0.10	0.44			0.30	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	76	53			1446	550	343	813			810	
v/s Ratio Prot	c0.04	0.01			c0.40		c0.10	0.16			c0.32	
v/s Ratio Perm						0.09						
v/c Ratio	0.95	0.21			0.98	0.21	1.01	0.36			1.16dr	
Uniform Delay, d1	52.4	50.6			31.7	20.7	49.5	20.8			38.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	83.8	0.7			18.7	0.9	51.6	0.1			49.7	
Delay (s)	136.2	51.3			50.4	21.6	101.1	20.9			88.2	
Level of Service	F	D			D	C	F	C			F	
Approach Delay (s)		92.9			47.3			64.2			88.2	
Approach LOS		F			D			E			F	

Intersection Summary				
HCM Average Control Delay	64.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	89.7%	ICU Level of Service	E	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	515	117	0	0	0	0	306	263	530	343	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91						0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99						0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.93		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	0.98	
Satd. Flow (prot)	1763	4881						3036		1610	3321	
Flt Permitted	0.95	1.00						1.00		0.95	0.98	
Satd. Flow (perm)	1763	4881						3036		1610	3321	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	219	572	130	0	0	0	0	360	309	609	394	0
RTOR Reduction (vph)	0	35	0	0	0	0	0	43	0	0	0	0
Lane Group Flow (vph)	219	667	0	0	0	0	0	626	0	329	674	0
Confl. Peds. (#/hr)	3		46							21	21	
Confl. Bikes (#/hr)			2							7		
Parking (#/hr)					0			5				
Turn Type	Perm									Split		
Protected Phases		4						2		6	6	
Permitted Phases	4											
Actuated Green, G (s)	26.0	26.0						33.0		34.0	34.0	
Effective Green, g (s)	26.0	26.0						33.0		34.0	34.0	
Actuated g/C Ratio	0.25	0.25						0.31		0.32	0.32	
Clearance Time (s)	5.0	5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)	432	1197						945		516	1065	
v/s Ratio Prot		c0.14						c0.21		c0.20	0.20	
v/s Ratio Perm	0.12											
v/c Ratio	0.51	0.56						0.66		0.64	0.63	
Uniform Delay, d1	34.5	35.0						31.7		30.7	30.7	
Progression Factor	0.60	0.58						1.00		1.00	1.00	
Incremental Delay, d2	3.3	1.5						3.7		5.9	2.9	
Delay (s)	24.1	21.7						35.3		36.7	33.5	
Level of Service	C	C						D		D	C	
Approach Delay (s)		22.3			0.0			35.3			34.6	
Approach LOS		C			A			D			C	

Intersection Summary				
HCM Average Control Delay	30.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	66.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SBL	SBT	SBR	SBR2
Lane Configurations												
Volume (vph)	6	324	363	25	126	839	142	82	74	129	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.93		
Flpb, ped/bikes		1.00	1.00		0.98	1.00			0.97	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.96		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3288		1734	3066			1556	2828		
Flt Permitted		0.57	1.00		0.50	1.00			0.42	0.94		
Satd. Flow (perm)		2005	3288		904	3066			695	2652		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	352	416	27	137	912	154	89	80	140	18	36
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	0	19	0	0
Lane Group Flow (vph)	0	361	438	0	137	1148	0	0	72	183	0	0
Confl. Peds. (#/hr)					70		70	70	70		70	70
Confl. Bikes (#/hr)							16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Perm				Perm			
Protected Phases		5	2			6				4		
Permitted Phases	5				6				4			
Actuated Green, G (s)		7.0	51.0		39.0	39.0			29.0	29.0		
Effective Green, g (s)		7.0	51.0		39.0	39.0			29.0	29.0		
Actuated g/C Ratio		0.08	0.57		0.43	0.43			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		161	1863		392	1329			224	855		
v/s Ratio Prot			0.13			c0.37						
v/s Ratio Perm		c0.17			0.15				0.10	0.07		
v/c Ratio		2.24	0.23		0.35	0.86			0.32	0.21		
Uniform Delay, d1		41.5	9.7		17.0	23.1			23.1	22.2		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		578.5	0.3		2.4	7.6			3.8	0.6		
Delay (s)		620.0	10.0		19.5	30.7			26.8	22.8		
Level of Service		F	B		B	C			C	C		
Approach Delay (s)			283.0			29.5				23.8		
Approach LOS			F			C				C		

Intersection Summary				
HCM Average Control Delay	101.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	105.9%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	58	21	179	151
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.97	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3105	
Flt Permitted			0.84	
Satd. Flow (perm)			2619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	23	195	164
RTOR Reduction (vph)	0	0	94	0
Lane Group Flow (vph)	0	0	351	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			844	
v/s Ratio Prot				
v/s Ratio Perm			c0.13	
v/c Ratio			0.42	
Uniform Delay, d1			23.9	
Progression Factor			1.00	
Incremental Delay, d2			1.5	
Delay (s)			25.4	
Level of Service			C	
Approach Delay (s)			25.4	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis Existing+Variants A & B- PM Peak - Mitigated
1: Santa Clara Av & Grand Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	268	473	555	210	256	469	180	51	563	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.98			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1619	1444	1735	3539	1291	1610	2971			3516	1296
Flt Permitted		0.48	1.00	0.67	1.00	1.00	0.95	0.93			0.82	1.00
Satd. Flow (perm)		804	1444	1215	3539	1291	1610	2761			2901	1296
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	95	11	295	531	624	236	275	504	194	55	605	342
RTOR Reduction (vph)	0	11	154	0	0	115	0	38	0	0	0	79
Lane Group Flow (vph)	0	125	111	531	624	121	247	668	0	0	660	263
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		37.7	37.7	37.7	37.7	37.7	13.0	43.3			26.3	26.3
Effective Green, g (s)		37.7	37.7	37.7	37.7	37.7	13.0	43.3			26.3	26.3
Actuated g/C Ratio		0.42	0.42	0.42	0.42	0.42	0.14	0.48			0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		337	605	509	1482	541	233	1359			848	379
v/s Ratio Prot					0.18		c0.15	0.07				
v/s Ratio Perm		0.16	0.08	c0.44		0.09		0.17			c0.23	0.20
v/c Ratio		0.37	0.18	1.04	0.42	0.22	1.06	0.51			0.78	0.70
Uniform Delay, d1		18.0	16.5	26.2	18.5	16.8	38.5	16.0			29.2	28.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.84	1.93			1.00	1.00
Incremental Delay, d2		3.1	0.7	51.6	0.9	1.0	71.7	1.2			7.0	10.1
Delay (s)		21.1	17.1	77.8	19.3	17.7	103.9	32.1			36.1	38.4
Level of Service		C	B	E	B	B	F	C			D	D
Approach Delay (s)		18.5			41.4			50.4			36.9	
Approach LOS		B			D			D			D	

Intersection Summary				
HCM Average Control Delay	40.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	103.7%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis Existing+Variants A & B- PM Peak - Mitigated
5: Lake Park Av & Lakeshore Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	0	173	159	796	270	213	354	0	0	246	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.70			1.00	0.93	1.00	1.00			0.90	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	932			3510	1290	3433	1863			2781	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	932			3510	1290	3433	1863			2781	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	87	0	204	171	856	290	254	421	0	0	276	222
RTOR Reduction (vph)	0	189	0	0	0	166	0	0	0	0	134	0
Lane Group Flow (vph)	78	24	0	0	1027	124	254	421	0	0	364	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0			26.2	26.2	6.1	23.3			13.2	
Effective Green, g (s)	5.0	5.0			26.2	26.2	6.1	23.3			13.2	
Actuated g/C Ratio	0.08	0.08			0.40	0.40	0.09	0.35			0.20	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	127	71			1393	512	317	658			556	
v/s Ratio Prot	c0.05	0.03			c0.29		0.07	c0.23			0.13	
v/s Ratio Perm						0.10						
v/c Ratio	0.61	0.34			0.74	0.24	0.80	0.64			0.65	
Uniform Delay, d1	29.6	28.9			17.0	13.3	29.4	17.8			24.3	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	6.1	1.1			3.5	1.1	12.8	1.5			2.1	
Delay (s)	35.6	30.0			20.5	14.4	42.2	19.4			26.4	
Level of Service	D	C			C	B	D	B			C	
Approach Delay (s)		31.5			19.1			27.9			26.4	
Approach LOS		C			B			C			C	

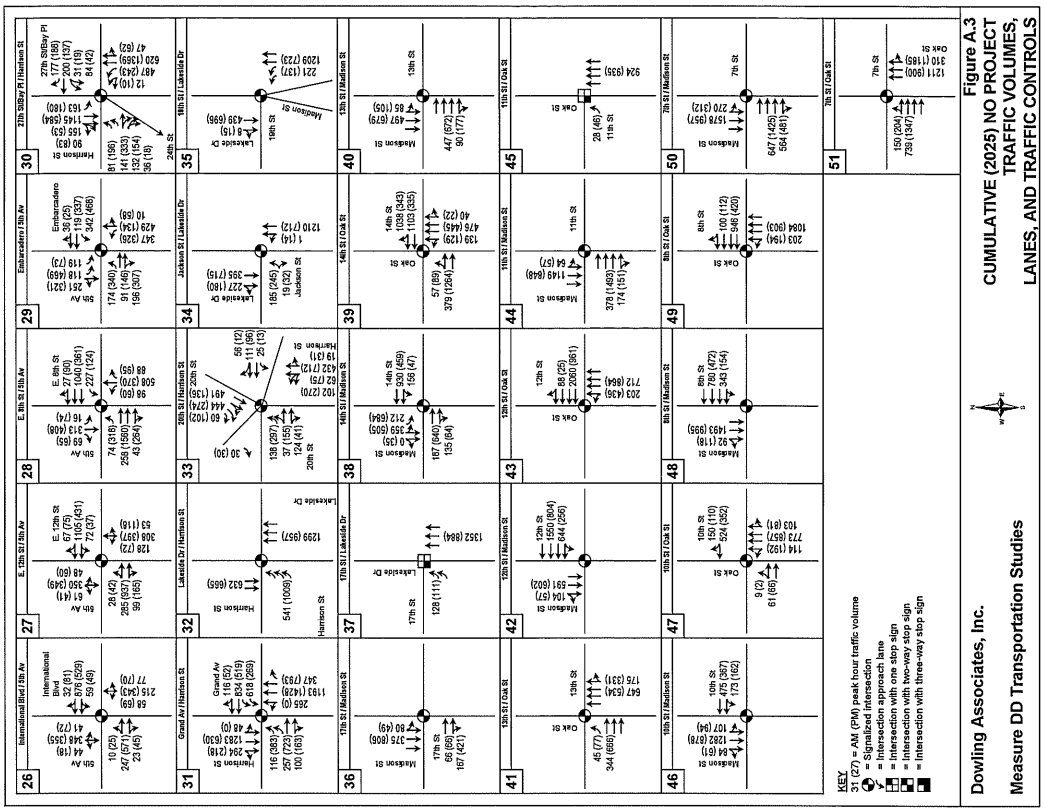
Intersection Summary				
HCM Average Control Delay	23.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	11.5	
Intersection Capacity Utilization	78.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

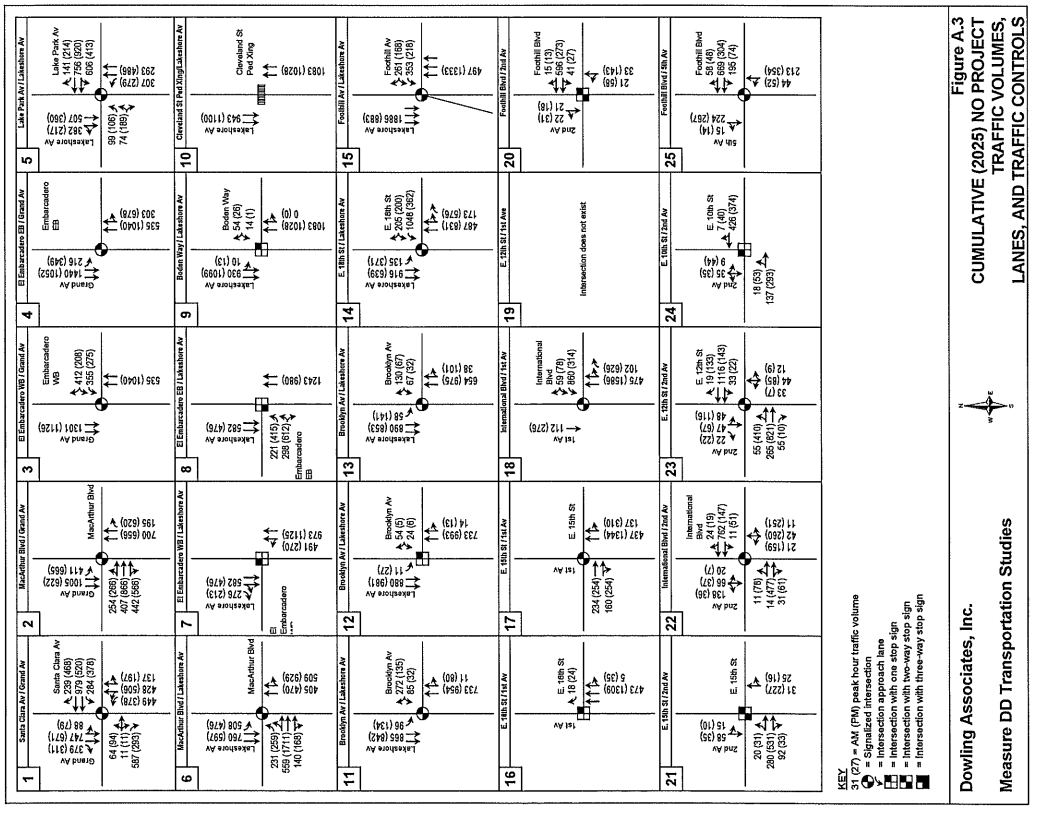
HCM Signalized Intersection Capacity Analysis Existing+Variants A & B- PM Peak - Mitigated
6: MacArthur Blvd & Lakeshore Av
Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1169	153	0	0	0	0	332	850	479	194	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91						0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99						0.91		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.98						0.89		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (prot)	1641	4969						2704		1610	3299	
Flt Permitted	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (perm)	1641	4969						2704		1610	3299	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	211	1244	163	0	0	0	0	349	895	544	220	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	211	1389	0	0	0	0	0	1242	0	272	492	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									Split		
Protected Phases		4						2		1	1	
Permitted Phases	4											
Actuated Green, G (s)	26.0	26.0						37.0		14.0	14.0	
Effective Green, g (s)	26.0	26.0						37.0		14.0	14.0	
Actuated g/C Ratio	0.29	0.29						0.41		0.16	0.16	
Clearance Time (s)	5.0	5.0						4.0		4.0	4.0	
Lane Grp Cap (vph)	474	1435						1112		250	513	
v/s Ratio Prot		c0.28						c0.46		c0.17	0.15	
v/s Ratio Perm	0.13											
v/c Ratio	0.45	0.97						1.88dr		1.09	1.04dl	
Uniform Delay, d1	26.1	31.6						26.5		38.0	37.7	
Progression Factor	0.64	0.67						1.00		1.00	1.00	
Incremental Delay, d2	1.8	12.2						65.0		82.4	30.8	
Delay (s)	18.6	33.5						91.5		120.4	68.5	
Level of Service	B	C						F		F	E	
Approach Delay (s)		31.5			0.0			91.5			87.0	
Approach LOS		C			A			F			F	

Intersection Summary				
HCM Average Control Delay	63.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	
Analysis Period (min)	15			
dl Defacto Left Lane. Recode with 1 though lane as a left lane.				
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

Cumulative Conditions


KEY
31 (27) = AM (PM) peak hour traffic volume
= Signalized Intersection
= Intersection approach lane
= Intersection with one stop sign
= Intersection with two-way stop sign
= Intersection with three-way stop sign
Dowling Associates, Inc.
Measure DD Transportation Studies
Figure A.3
CUMULATIVE (2025) NO PROJECT
TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS


KEY
31 (27) = AM (PM) peak hour traffic volume
= Signalized Intersection
= Intersection approach lane
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Dowling Associates, Inc.
Measure DD Transportation Studies
Figure A.3
CUMULATIVE (2025) NO PROJECT
TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	11	567	284	979	239	449	426	137	66	747	379
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.98			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.97			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	0.99			0.99	1.00
Satd. Flow (prot)		1446	1279	1599	3539	1319	1610	3004			3510	1291
Flt Permitted		0.44	1.00	0.59	1.00	1.00	0.95	0.51			0.76	1.00
Satd. Flow (perm)		646	1279	992	3539	1319	1610	1549			2673	1291
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	70	12	616	302	1041	254	473	451	144	96	812	412
RTOR Reduction (vph)	0	48	174	0	0	63	0	20	0	0	0	26
Lane Group Flow (vph)	0	149	349	302	1041	191	355	693	0	0	908	386
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		296	585	454	1619	604	190	880			807	390
v/s Ratio Prot					0.29		c0.22	0.09				
v/s Ratio Perm		0.23	0.27	c0.30		0.14		0.27			c0.34	0.30
v/c Ratio		0.50	0.60	0.67	0.64	0.32	1.87	0.79			1.13	0.99
Uniform Delay, d1		20.3	21.5	22.4	22.1	18.2	46.8	24.4			37.0	36.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.73	1.67			1.00	1.00
Incremental Delay, d2		6.0	4.5	7.5	2.0	1.4	403.6	4.7			72.0	43.2
Delay (s)		26.3	25.9	29.9	24.1	19.6	437.6	45.4			109.0	80.0
Level of Service		C	C	C	C	B	F	D			F	F
Approach Delay (s)		26.0			24.5			175.8			100.0	
Approach LOS		C			C			F			F	

Intersection Summary				
HCM Average Control Delay	80.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	106.9%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	254	407	442	0	0	0	0	700	195	411	1005	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.98						1.00	1.00	1.00	1.00	
Frt		0.94						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4285						3539	1329	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4285						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	262	420	456	0	0	0	0	761	212	447	1092	0
RTOR Reduction (vph)	0	56	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1082	0	0	0	0	0	761	212	447	1092	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1475						968	1329	459	1894	
v/s Ratio Prot								c0.22		c0.25		
v/s Ratio Perm		0.25							0.16		0.33	
v/c Ratio		0.88dr						0.79	0.16	0.97	0.58	
Uniform Delay, d1		30.5						35.6	0.0	38.9	14.6	
Progression Factor		1.00						1.00	1.00	1.09	0.61	
Incremental Delay, d2		3.3						6.4	0.3	22.5	0.6	
Delay (s)		33.7						42.0	0.3	64.8	9.5	
Level of Service		C						D	A	E	A	
Approach Delay (s)		33.7			0.0			32.9			25.5	
Approach LOS		C			A			C			C	

Intersection Summary				
HCM Average Control Delay	30.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	355	412	535	0	0	1301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frpb, ped/bikes	0.98	0.97	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	0.95	0.85	1.00			1.00
Flt Protected	0.97	1.00	1.00			1.00
Satd. Flow (prot)	3267	1393	3318			3318
Flt Permitted	0.97	1.00	1.00			1.00
Satd. Flow (perm)	3267	1393	3318			3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	386	448	582	0	0	1414
RTOR Reduction (vph)	87	197	0	0	0	0
Lane Group Flow (vph)	483	67	582	0	0	1414
Confl. Peds. (#/hr)	70	7				
Confl. Bikes (#/hr)		16				
Parking (#/hr)			5			5
Turn Type		Perm				
Protected Phases	4		6			6
Permitted Phases		4				
Actuated Green, G (s)	20.3	20.3	50.7			50.7
Effective Green, g (s)	20.3	20.3	50.7			50.7
Actuated g/C Ratio	0.25	0.25	0.63			0.63
Clearance Time (s)	4.0	4.0	5.0			5.0
Vehicle Extension (s)	2.0	2.0	2.0			2.0
Lane Grp Cap (vph)	829	353	2103			2103
v/s Ratio Prot	c0.15		0.18			c0.43
v/s Ratio Perm		0.05				
v/c Ratio	0.58	0.19	0.28			0.67
Uniform Delay, d1	26.1	23.4	6.5			9.3
Progression Factor	1.00	1.00	0.14			1.00
Incremental Delay, d2	0.7	0.1	0.3			1.7
Delay (s)	26.8	23.5	1.2			11.1
Level of Service	C	C	A			B
Approach Delay (s)	25.8		1.2			11.1
Approach LOS	C		A			B

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	91.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: El Embarcadero EB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	535	303	216	1440
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0		4.0	4.0
Lane Util. Factor			0.95		1.00	0.95
Frpb, ped/bikes			0.98		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			0.95		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3272		1763	3362
Flt Permitted			1.00		0.31	1.00
Satd. Flow (perm)			3272		581	3362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	582	329	235	1565
RTOR Reduction (vph)	0	0	82	0	0	0
Lane Group Flow (vph)	0	0	829	0	235	1565
Confl. Peds. (#/hr)				29	29	
Confl. Bikes (#/hr)				5		
Parking (#/hr)				5	0	
Turn Type					custom	
Protected Phases			2		1	1 6 7
Permitted Phases					1 4 6 7	
Actuated Green, G (s)			41.7		76.0	68.8
Effective Green, g (s)			41.7		76.0	68.8
Actuated g/C Ratio			0.52		0.95	0.86
Clearance Time (s)			5.0		4.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)			1706		626	2891
v/s Ratio Prot			0.25		0.02	c0.47
v/s Ratio Perm					c0.33	
v/c Ratio			0.49		0.38	0.54
Uniform Delay, d1			12.3		0.2	1.5
Progression Factor			1.00		0.41	0.60
Incremental Delay, d2			1.0		0.1	0.1
Delay (s)			13.3		0.2	1.0
Level of Service			B		A	A
Approach Delay (s)	0.0		13.3		0.9	
Approach LOS	A		B		A	

Intersection Summary				
HCM Average Control Delay	5.0	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	91.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	74	606	756	141	307	293	0	0	507	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.85			1.00	0.97	1.00	1.00			0.94	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.87			1.00	0.85	1.00	1.00			0.94	
Flt Protected	0.95	0.99			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1133			3462	1345	1770	3539			2904	
Flt Permitted	0.95	0.99			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1133			3462	1345	1770	3539			2904	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	80	631	788	147	334	318	0	0	539	406
RTOR Reduction (vph)	0	77	0	0	0	62	0	0	0	0	86	0
Lane Group Flow (vph)	97	14	0	0	1419	85	334	318	0	0	859	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Effective Green, g (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Actuated g/C Ratio	0.04	0.04			0.31	0.31	0.16	0.51			0.29	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	63	42			1082	420	288	1792			853	
v/s Ratio Prot	c0.06	0.01			c0.41		c0.19	0.09			c0.30	
v/s Ratio Perm						0.06						
v/c Ratio	1.54	0.33			1.31	0.20	1.16	0.18			1.01	
Uniform Delay, d1	38.5	37.5			27.5	20.2	33.5	10.7			28.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	307.3	1.7			146.8	1.1	103.4	0.0			32.5	
Delay (s)	345.8	39.2			174.3	21.3	136.9	10.7			60.7	
Level of Service	F	D			F	C	F	B			E	
Approach Delay (s)		197.4			160.0			75.4			60.7	
Approach LOS		F			F			E			E	

Intersection Summary				
HCM Average Control Delay	117.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	105.7%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	231	559	140	0	0	0	0	405	509	608	760	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.92		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1516	4597						2951		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.12	1.00	
Satd. Flow (perm)	1516	4597						2951		216	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	251	608	152	0	0	0	0	440	553	552	826	0
RTOR Reduction (vph)	0	34	0	0	0	0	0	60	0	0	0	0
Lane Group Flow (vph)	226	751	0	0	0	0	0	933	0	552	826	0
Confl. Peds. (#/hr)	3		46							21	21	
Confl. Bikes (#/hr)			2							7		
Parking (#/hr)					0			5				
Turn Type	Perm										pm+pt	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1344						863		596	2204	
v/s Ratio Prot								c0.32		c0.28	0.23	
v/s Ratio Perm	0.15	0.16								0.30		
v/c Ratio	0.51	0.56						1.20dr		0.93	0.37	
Uniform Delay, d1	31.2	31.7						37.5		28.8	9.8	
Progression Factor	1.12	1.13						1.00		1.00	1.00	
Incremental Delay, d2	2.8	1.1						54.9		22.6	0.5	
Delay (s)	37.9	37.1						92.4		51.3	10.3	
Level of Service	D	D						F		D	B	
Approach Delay (s)		37.2			0.0			92.4			26.8	
Approach LOS		D			A			F			C	

Intersection Summary				
HCM Average Control Delay	49.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.5	
Intersection Capacity Utilization	89.3%	ICU Level of Service	E	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1053	0	0	943
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3318			3318
Flt Permitted			1.00			1.00
Satd. Flow (perm)			3318			3318
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	0	1140	0	0	1025
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1140	0	0	1025
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2800			2800
v/s Ratio Prot			c0.34			0.31
v/s Ratio Perm						
v/c Ratio			0.41			0.37
Uniform Delay, d1			2.2			2.1
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.0
Delay (s)			2.3			2.2
Level of Service			A			A
Approach Delay (s)	0.0		2.3			2.2
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	33.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	65	272	733	11	96	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.91		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.90		1.00		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1322		3305		1770	3318
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1322		3305		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	296	797	12	104	940
RTOR Reduction (vph)	169	0	2	0	0	0
Lane Group Flow (vph)	219	0	807	0	104	940
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	9.8		14.5		4.1	22.6
Effective Green, g (s)	9.8		14.5		4.1	22.6
Actuated g/C Ratio	0.26		0.38		0.11	0.59
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	337		1248		189	1953
v/s Ratio Prot	c0.17		c0.24		c0.06	0.28
v/s Ratio Perm						
v/c Ratio	0.65		0.65		0.55	0.48
Uniform Delay, d1	12.8		9.8		16.3	4.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.2		0.9		2.0	0.1
Delay (s)	16.0		10.7		18.2	4.6
Level of Service	B		B		B	A
Approach Delay (s)	16.0		10.7			6.0
Approach LOS	B		B			A

Intersection Summary				
HCM Average Control Delay	9.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	61.2%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av 5/23/2007

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis
8: El Embarcadero EB & Lakeshore Av 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	221	298	0	1243	582	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	240	324	0	1351	633	0
Pedestrians				12	15	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				763		
pX, platoon unblocked	0.95					
vC, conflicting volume	1323	328	633			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1235	328	633			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	51	100			
cM capacity (veh/h)	158	661	946			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	160	404	676	676	316	316
Volume Left	160	80	0	0	0	0
Volume Right	0	324	0	0	0	0
cSH	158	405	1700	1700	1700	1700
Volume to Capacity	1.01	1.00	0.40	0.40	0.19	0.19
Queue Length 95th (ft)	197	305	0	0	0	0
Control Delay (s)	132.3	76.1	0.0	0.0	0.0	0.0
Lane LOS	F	F				
Approach Delay (s)	92.1		0.0		0.0	
Approach LOS	F					

Intersection Summary				
Average Delay	20.4			
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	54	1063	0	10	930
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	15	59	1140	0	11	1011
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.93	0.93			0.93	
vC, conflicting volume	1684	587			1156	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1579	394			1008	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	89			98	
cM capacity (veh/h)	90	552			624	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	760	380	348	674
Volume Left	15	0	0	11	0
Volume Right	59	0	0	0	0
cSH	268	1700	1700	624	1700
Volume to Capacity	0.28	0.45	0.22	0.02	0.40
Queue Length 95th (ft)	27	0	0	1	0
Control Delay (s)	23.5	0.0	0.0	0.6	0.0
Lane LOS	C			A	
Approach Delay (s)	23.5	0.0		0.2	
Approach LOS	C				

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	43.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	24	54	733	14	11	880
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	26	59	797	15	12	926
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.91					
vC, conflicting volume	1319	423			828	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	423			828	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	90			99	
cM capacity (veh/h)	166	571			788	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	85	531	281	12	463	463
Volume Left	26	0	0	12	0	0
Volume Right	59	0	15	0	0	0
cSH	327	1700	1700	788	1700	1700
Volume to Capacity	0.26	0.31	0.17	0.01	0.27	0.27
Queue Length 95th (ft)	25	0	0	1	0	0
Control Delay (s)	19.8	0.0	0.0	9.6	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	19.8	0.0		0.1		
Approach LOS	C					

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	36.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	67	130	654	38	58	890
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.97		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1418		3279		1768	3318
Flt Permitted	0.98		1.00		0.20	1.00
Satd. Flow (perm)	1418		3279		375	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	73	141	711	41	60	927
RTOR Reduction (vph)	89	0	7	0	0	0
Lane Group Flow (vph)	125	0	745	0	60	927
Confl. Peds. (#/hr)	70		31		17	17
Confl. Bikes (#/hr)			7		15	
Parking (#/hr)	5		5			5
Turn Type					pm+pt	
Protected Phases	7		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	22.0		22.0		31.0	31.0
Effective Green, g (s)	22.0		22.0		31.0	31.0
Actuated g/C Ratio	0.37		0.37		0.52	0.52
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	520		1202		310	1714
v/s Ratio Prot	c0.09		c0.23		0.02	c0.28
v/s Ratio Perm					0.08	
v/c Ratio	0.24		0.62		0.19	0.54
Uniform Delay, d1	13.2		15.6		8.5	9.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.1		2.4		1.4	1.2
Delay (s)	14.3		18.0		9.9	11.0
Level of Service	B		B		A	B
Approach Delay (s)	14.3		18.0			10.9
Approach LOS	B		B			B

Intersection Summary				
HCM Average Control Delay	14.0	HCM Level of Service		B
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		10.0
Intersection Capacity Utilization	50.2%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	1048	205	487	173	135	916
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		0.91	0.91	1.00	0.95
Frpb, ped/bikes	0.98		1.00	0.93	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		0.99	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3276		3363	1326	1770	3318
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	3276		3363	1326	1770	3318
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1127	220	529	188	147	996
RTOR Reduction (vph)	21	0	3	114	0	0
Lane Group Flow (vph)	1326	0	545	55	147	996
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)					5	
Turn Type				Perm	Prot	
Protected Phases	4		2		1	
Permitted Phases				2		6
Actuated Green, G (s)	26.0		26.0	26.0	19.0	48.0
Effective Green, g (s)	26.0		26.0	26.0	19.0	48.0
Actuated g/C Ratio	0.32		0.32	0.32	0.24	0.60
Clearance Time (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1065		1093	431	420	1991
v/s Ratio Prot	c0.40		0.16		0.08	
v/s Ratio Perm				0.04		c0.30
v/c Ratio	1.25		0.50	0.13	0.35	0.50
Uniform Delay, d1	27.0		21.8	19.0	25.4	9.1
Progression Factor	1.00		0.83	0.79	1.00	1.00
Incremental Delay, d2	116.3		1.6	0.6	2.3	0.9
Delay (s)	145.3		19.6	15.7	27.7	10.0
Level of Service	F		B	B	C	B
Approach Delay (s)	145.3		18.7			12.3
Approach LOS	F		B			B

Intersection Summary				
HCM Average Control Delay	69.6	HCM Level of Service		E
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	74.7%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Lakeshore Av & Foothill Blvd #2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	353	261	0	497	0	0	0	1886
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5			3.0				3.0
Lane Util. Factor					0.95			0.91				*0.91
Frpb, ped/bikes					0.98			1.00				1.00
Flpb, ped/bikes					1.00			1.00				1.00
Frt					0.94			1.00				1.00
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					3000			4690				4893
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					3000			4690				4893
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	384	284	0	540	0	0	0	2050
RTOR Reduction (vph)	0	0	0	0	168	0	0	0	0	0	0	171
Lane Group Flow (vph)	0	0	0	0	500	0	0	540	0	0	0	1879
Confl. Peds. (#/hr)						43						
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	6%	2%	2%	2%	6%
Parking (#/hr)		0			5			5				
Turn Type												custom
Protected Phases					2			1				
Permitted Phases												1
Actuated Green, G (s)					25.5			48.0				48.0
Effective Green, g (s)					25.5			48.0				48.0
Actuated g/C Ratio					0.32			0.60				0.60
Clearance Time (s)					3.5			3.0				3.0
Lane Grp Cap (vph)					956			2814				2936
v/s Ratio Prot					c0.17			0.12				
v/s Ratio Perm												c0.38
v/c Ratio					0.52			0.19				0.64
Uniform Delay, d1					22.3			7.2				10.4
Progression Factor					1.00			0.86				0.32
Incremental Delay, d2					2.0			0.1				0.5
Delay (s)					24.3			6.4				3.8
Level of Service					C			A				A
Approach Delay (s)		0.0			24.3			6.4			3.8	
Approach LOS		A			C			A			A	

Intersection Summary				
HCM Average Control Delay	8.4	HCM Level of Service		A
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	71.1%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	234	160	0	0	0	0	437	137	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.5				
Lane Util. Factor		0.95						0.95				
Frpb, ped/bikes		0.94						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		0.94						0.96				
Flt Protected		1.00						1.00				
Satd. Flow (prot)		2924						3076				
Flt Permitted		1.00						1.00				
Satd. Flow (perm)		2924						3076				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	254	174	0	0	0	0	475	149	0	0	0
RTOR Reduction (vph)	0	115	0	0	0	0	0	37	0	0	0	0
Lane Group Flow (vph)	0	313	0	0	0	0	0	587	0	0	0	0
Confl. Peds. (#/hr)			70						17			
Confl. Bikes (#/hr)			16						4			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	4%	2%	2%	2%
Parking (#/hr)		0			0			5			0	
Turn Type												
Protected Phases		2						1				
Permitted Phases												
Actuated Green, G (s)		27.0						46.0				
Effective Green, g (s)		27.0						46.0				
Actuated g/C Ratio		0.34						0.57				
Clearance Time (s)		3.5						3.5				
Lane Grp Cap (vph)		987						1769				
v/s Ratio Prot		c0.11						c0.19				
v/s Ratio Perm												
v/c Ratio		0.32						0.33				
Uniform Delay, d1		19.7						8.9				
Progression Factor		1.74						1.00				
Incremental Delay, d2		0.7						0.5				
Delay (s)		34.9						9.4				
Level of Service		C						A				
Approach Delay (s)		34.9			0.0			9.4			0.0	
Approach LOS		C			A			A			A	

Intersection Summary				
HCM Average Control Delay	19.8	HCM Level of Service		B
HCM Volume to Capacity ratio	0.33			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	64.2%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	473	5	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	514	5	0	0
Pedestrians	70					70
Lane Width (ft)	12.0					0.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			219			149
pX, platoon unblocked						
vC, conflicting volume	587	314			590	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	587	314			590	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	415	642			925	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3		
Volume Total	20	206	206	108		
Volume Left	0	0	0	0		
Volume Right	20	0	0	5		
cSH	642	1700	1700	1700		
Volume to Capacity	0.03	0.12	0.12	0.06		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	10.8	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.8	0.0				
Approach LOS	B					

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	32.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	41	596	15	21	33	0	0	21	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	45	648	16	23	36	0	0	23	24
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	667			26			499	782	26	766	774	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	667			26			499	782	26	766	774	360
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			94	88	100	100	93	96
cM capacity (veh/h)	916			1552			388	307	1021	255	311	635

Direction, Lane #	WB 1	WB 2	NB 1	SB 1		
Volume Total	368	340	59	47		
Volume Left	45	0	23	0		
Volume Right	0	16	0	24		
cSH	1552	1700	334	421		
Volume to Capacity	0.03	0.20	0.18	0.11		
Queue Length 95th (ft)	2	0	16	9		
Control Delay (s)	1.1	0.0	18.0	14.6		
Lane LOS	A		C	B		
Approach Delay (s)	0.6		18.0	14.6		
Approach LOS			C	B		

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	34.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	280	92	0	0	0	0	31	25	16	58	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	304	100	0	0	0	0	34	27	16	63	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	17			431			456	442	259	287	492	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			302			328	313	121	150	365	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	94	97	98	88	100
cM capacity (veh/h)	1576			1169			488	544	845	669	508	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1		
Volume Total	174	252	61	79		
Volume Left	22	0	0	16		
Volume Right	0	100	27	0		
cSH	1576	1700	647	534		
Volume to Capacity	0.01	0.15	0.09	0.15		
Queue Length 95th (ft)	1	0	8	13		
Control Delay (s)	1.0	0.0	11.1	12.9		
Lane LOS	A		B	B		
Approach Delay (s)	0.4		11.1	12.9		
Approach LOS			B	B		

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	18	137	426	7	9	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	149	463	8	10	38
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	541				795	607
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	541				795	607
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				97	91
cM capacity (veh/h)	968				310	440

Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	168	471	48			
Volume Left	20	0	10			
Volume Right	0	8	38			
cSH	968	1700	405			
Volume to Capacity	0.02	0.28	0.12			
Queue Length 95th (ft)	2	0	10			
Control Delay (s)	1.2	0.0	15.1			
Lane LOS	A		C			
Approach Delay (s)	1.2	0.0	15.1			
Approach LOS			C			

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	42.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	860	59	475	102	0	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.5	4.0		3.5
Lane Util. Factor	0.97		0.91	0.91		1.00
Frpb, ped/bikes	0.99		1.00	0.98		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3334		3252	1388		1568
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3334		3252	1388		1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	935	64	516	111	0	122
RTOR Reduction (vph)	5	0	2	0	0	0
Lane Group Flow (vph)	994	0	525	100	0	122
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				5
Turn Type				Free		
Protected Phases	2					
Permitted Phases			1	Free		1
Actuated Green, G (s)	45.0		45.0	97.0		45.0
Effective Green, g (s)	45.0		45.0	97.0		45.0
Actuated g/C Ratio	0.46		0.46	1.00		0.46
Clearance Time (s)	3.5		3.5			3.5
Lane Grp Cap (vph)	1547		1509	1388		727
v/s Ratio Prot	c0.30					
v/s Ratio Perm			c0.16	0.07		0.08
v/c Ratio	0.64		0.35	0.07		0.17
Uniform Delay, d1	19.9		16.6	0.0		15.1
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	2.1		0.6	0.1		0.5
Delay (s)	21.9		17.3	0.1		15.6
Level of Service	C		B	A		B
Approach Delay (s)	21.9		14.5			15.6
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	14	31	11	762	24	21	42	11	20	66	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.99			0.99	
Frt		0.92			1.00			0.98			0.92	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		2638			3229			1534			1399	
Flt Permitted		0.86			0.95			0.91			0.98	
Satd. Flow (perm)		2468			3078			1421			1377	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	15	34	12	828	26	23	46	12	22	72	150
RTOR Reduction (vph)	0	21	0	0	6	0	0	6	0	0	60	0
Lane Group Flow (vph)	0	40	0	0	860	0	0	75	0	0	184	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		25.2			25.2			33.8			33.8	
Effective Green, g (s)		25.2			25.2			33.8			33.8	
Actuated g/C Ratio		0.39			0.39			0.52			0.52	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		957			1193			739			716	
v/s Ratio Prot												
v/s Ratio Perm		0.02			c0.28			0.05			c0.13	
v/c Ratio		0.04			0.72			0.10			0.26	
Uniform Delay, d1		12.4			16.9			7.9			8.6	
Progression Factor		1.00			0.40			1.06			1.00	
Incremental Delay, d2		0.0			1.2			0.3			0.9	
Delay (s)		12.4			7.9			8.7			9.5	
Level of Service		B			A			A			A	
Approach Delay (s)		12.4			7.9			8.7			9.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007

Movement	WBL2	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2	NEL	NER
Lane Configurations												
Volume (vph)	33	1116	0	19	33	44	12	46	47	22	55	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Util. Factor		0.95	1.00			1.00			1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	0.90			0.99			1.00	0.92	1.00	1.00
Flpb, ped/bikes		1.00	1.00			0.97			0.97	1.00	0.98	1.00
Frt		1.00	0.85			0.98			1.00	0.85	0.90	1.00
Flt Protected		1.00	1.00			0.98			0.98	1.00	0.98	1.00
Satd. Flow (prot)		3527	1243			1499			1765	1268	1609	1770
Flt Permitted		1.00	1.00			0.88			0.83	1.00	0.98	1.00
Satd. Flow (perm)		3527	1243			1340			1497	1268	1609	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	1213	0	21	36	48	13	52	51	24	60	288
RTOR Reduction (vph)	0	0	10	0	0	8	0	0	0	0	0	0
Lane Group Flow (vph)	0	1249	11	0	0	89	0	0	103	24	178	170
Confl. Peds. (#/hr)	70			70	70		70	70		70	70	
Confl. Bikes (#/hr)				16			16			16		
Parking (#/hr)			5			5				5		
Turn Type	Perm		Perm		Perm		Perm		Perm			custom
Protected Phases		1				2			2			
Permitted Phases	1		1		2		2			2	1	1
Actuated Green, G (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Effective Green, g (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Actuated g/C Ratio		0.51	0.51			0.35			0.35	0.35	0.51	0.51
Clearance Time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Grp Cap (vph)		1791	631			474			530	449	817	899
v/s Ratio Prot												
v/s Ratio Perm		0.35	0.01			0.07			c0.07	0.02	0.11	0.10
v/c Ratio		0.70	0.02			0.19			0.19	0.05	0.22	0.19
Uniform Delay, d1		12.2	7.9			14.5			14.6	13.8	8.9	8.7
Progression Factor		1.82	1.00			1.00			0.94	0.91	1.00	1.00
Incremental Delay, d2		0.9	0.0			0.9			0.8	0.2	0.6	0.5
Delay (s)		23.0	8.0			15.4			14.5	12.8	9.5	9.2
Level of Service		C	A			B			B	B	A	A
Approach Delay (s)		22.8				15.4			14.1		9.2	
Approach LOS		C				B			B		A	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007

Movement	NER2
Lane Configurations	
Volume (vph)	55
Ideal Flow (vphpl)	1900
Total Lost time (s)	3.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.90
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1421
Flt Permitted	1.00
Satd. Flow (perm)	1421
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	60
RTOR Reduction (vph)	0
Lane Group Flow (vph)	60
Confl. Peds. (#/hr)	70
Confl. Bikes (#/hr)	16
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	1
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.51
Clearance Time (s)	3.0
Lane Grp Cap (vph)	721
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.08
Uniform Delay, d1	8.2
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	8.5
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	195	669	59	44	213	0	0	224	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.98			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3213			1647			1652	
Flt Permitted					0.99			0.92			1.00	
Satd. Flow (perm)					3213			1529			1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	212	727	63	48	232	0	0	243	16
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	994	0	0	280	0	0	255	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1335			741			801	
v/s Ratio Prot											0.15	
v/s Ratio Perm					0.31			c0.18				
v/c Ratio					0.74			0.38			0.32	
Uniform Delay, d1					16.1			10.6			10.2	
Progression Factor					1.00			1.33			1.00	
Incremental Delay, d2					3.8			1.2			1.0	
Delay (s)					19.9			15.2			11.3	
Level of Service					B			B			B	
Approach Delay (s)		0.0			19.9			15.2			11.3	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	17.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	63.7%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	247	23	59	876	32	58	215	77	41	348	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3284			3313			1564			1630	
Flt Permitted		0.92			0.91			0.88			0.94	
Satd. Flow (perm)		3032			3038			1407			1536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	268	25	64	952	35	63	234	84	45	378	48
RTOR Reduction (vph)	0	10	0	0	4	0	0	16	0	0	6	0
Lane Group Flow (vph)	0	294	0	0	1047	0	0	365	0	0	465	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1376			1379			606			662	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.34			0.26			c0.30	
v/c Ratio		0.21			0.76			0.60			0.70	
Uniform Delay, d1		10.7			14.8			14.2			15.1	
Progression Factor		1.06			1.00			0.93			0.66	
Incremental Delay, d2		0.4			4.0			0.4			5.4	
Delay (s)		11.8			18.8			13.6			15.4	
Level of Service		B			B			B			B	
Approach Delay (s)		11.8			18.8			13.6			15.4	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	285	99	72	1105	67	126	306	53	48	350	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.96			0.99			0.99			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3162			3304			1609			1619	
Flt Permitted		0.82			0.90			0.68			0.92	
Satd. Flow (perm)		2616			2972			1114			1489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	310	108	78	1201	73	139	335	58	52	380	66
RTOR Reduction (vph)	0	47	0	0	6	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	401	0	0	1346	0	0	525	0	0	489	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1328			1509			428			573	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.45			c0.47			0.33	
v/c Ratio		0.30			0.89			1.23			0.85	
Uniform Delay, d1		9.3			14.4			20.0			18.3	
Progression Factor		0.81			1.00			0.41			0.66	
Incremental Delay, d2		0.6			8.4			115.5			11.8	
Delay (s)		8.1			22.8			123.6			24.4	
Level of Service		A			C			F			C	
Approach Delay (s)		8.1			22.8			123.6			24.4	
Approach LOS		A			C			F			C	

Intersection Summary				
HCM Average Control Delay	39.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	125.2%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	268	43	227	1040	27	98	508	88	16	313	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.98	1.00		0.97	1.00		0.97	1.00	1.00	0.98	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1743	4761		1711	4883		1718	1676	1471	1737	1676	1471
Flt Permitted	0.18	1.00		0.55	1.00		0.45	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	326	4761		984	4883		814	1676	1471	439	1676	1471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	280	47	247	1130	29	107	552	96	17	340	75
RTOR Reduction (vph)	0	25	0	0	4	0	0	0	55	0	0	16
Lane Group Flow (vph)	80	302	0	247	1155	0	107	552	41	17	340	59
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		2
Actuated Green, G (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	153	2234		462	2291		344	709	622	186	709	622
v/s Ratio Prot		0.06			0.24			c0.33			0.20	
v/s Ratio Perm	0.25			c0.25			0.13		0.03	0.04		0.04
v/c Ratio	0.52	0.14		0.53	0.50		0.31	0.78	0.07	0.09	0.48	0.09
Uniform Delay, d1	12.1	9.8		12.2	12.0		12.5	16.1	11.1	11.3	13.6	11.3
Progression Factor	1.00	1.00		1.00	1.00		0.78	0.74	0.78	0.55	0.53	0.42
Incremental Delay, d2	12.2	0.1		4.4	0.8		2.1	7.4	0.2	0.6	1.5	0.2
Delay (s)	24.3	9.9		16.6	12.8		11.8	19.3	8.8	6.8	8.6	4.9
Level of Service	C	A		B	B		B	B	A	A	A	A
Approach Delay (s)		12.7			13.5			16.9			7.9	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM Average Control Delay	13.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	77.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	91	196	342	119	36	347	429	10	119	118	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	0.98		1.00	1.00		1.00	0.95	
Flpb, ped/bikes	0.95	1.00		0.93	1.00		0.97	1.00		0.96	1.00	
Frt	1.00	0.90		1.00	0.97		1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	2720		1639	3180		1717	1666		3289	1426	
Flt Permitted	0.65	1.00		0.56	1.00		0.43	1.00		0.36	1.00	
Satd. Flow (perm)	1138	2720		970	3180		774	1668		1246	1426	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	99	213	372	129	39	377	466	11	129	128	273
RTOR Reduction (vph)	0	128	0	0	23	0	0	1	0	0	118	0
Lane Group Flow (vph)	189	184	0	372	145	0	377	476	0	129	283	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.0	26.0		26.0	26.0		31.0	31.0		31.0	31.0	
Effective Green, g (s)	26.0	26.0		26.0	26.0		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.48	0.48		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	455	1088		388	1272		369	796		594	680	
v/s Ratio Prot		0.07			0.05			0.29			0.20	
v/s Ratio Perm	0.17			c0.38			c0.49			0.10		
v/c Ratio	0.42	0.17		0.96	0.11		1.02	0.60		0.22	0.42	
Uniform Delay, d1	14.0	12.5		19.0	12.3		17.0	12.4		9.9	11.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.84	0.80	
Incremental Delay, d2	2.8	0.3		36.4	0.2		52.5	3.3		0.7	1.7	
Delay (s)	16.8	12.9		55.4	12.4		69.5	15.7		9.1	10.6	
Level of Service	B	B		E	B		E	B		A	B	
Approach Delay (s)		14.4			42.0			39.5			10.2	
Approach LOS		B			D			D			B	

Intersection Summary				
HCM Average Control Delay	28.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	12	487	620	47	163	1145	155	90	81	141	132	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	0.99		1.00	0.96			1.00	0.92		0.91
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.97			1.00	0.93		0.85
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3433	3259		1770	3102			3433	1313		1362
Flt Permitted		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		3433	3259		1770	3102			3433	1313		1362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	529	674	51	177	1245	168	98	88	153	143	39
RTOR Reduction (vph)	0	0	5	0	0	4	0	0	0	1	0	26
Lane Group Flow (vph)	0	542	720	0	177	1507	0	0	88	299	0	9
Confl. Peds. (#/hr)				70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Prot				Prot			Perm
Protected Phases	5	5	2		1	6			7	4		
Permitted Phases												4
Actuated Green, G (s)		7.0	54.1		5.0	51.1			4.0	27.5		27.5
Effective Green, g (s)		7.0	54.1		5.0	51.1			4.0	27.5		27.5
Actuated g/C Ratio		0.06	0.50		0.05	0.47			0.04	0.25		0.25
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		221	1623		81	1460			126	332		345
v/s Ratio Prot		c0.16	c0.22		0.10	c0.49			0.03	c0.23		
v/s Ratio Perm												0.01
v/c Ratio		2.45	0.44		2.19	1.03			0.70	0.90		0.03
Uniform Delay, d1		50.8	17.6		51.8	28.7			51.7	39.2		30.5
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		667.1	0.9		571.6	32.2			12.8	25.7		0.0
Delay (s)		717.9	18.4		623.4	60.9			64.5	65.0		30.5
Level of Service		F	B		F	E			E	E		C
Approach Delay (s)			317.7			119.9				62.0		
Approach LOS			F			F				E		

Intersection Summary				
HCM Average Control Delay	181.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.20			
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	24.0	
Intersection Capacity Utilization	102.7%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	84	31	200	177
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1434
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1434
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	34	217	192
RTOR Reduction (vph)	0	0	0	143
Lane Group Flow (vph)	0	125	217	49
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	3	3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	27.5	27.5
Effective Green, g (s)		4.0	27.5	27.5
Actuated g/C Ratio		0.04	0.25	0.25
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		65	472	363
v/s Ratio Prot		c0.07	0.12	
v/s Ratio Perm				0.03
v/c Ratio		1.92	0.46	0.14
Uniform Delay, d1		52.3	34.3	31.4
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		466.7	0.3	0.1
Delay (s)		519.0	34.5	31.4
Level of Service		F	C	C
Approach Delay (s)			146.8	
Approach LOS			F	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	257	100	618	834	116	265	1193	347	48	1283	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.98			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3246		3400	3384			4999	1456		4609	
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.74	
Satd. Flow (perm)	3433	3246		3400	3384			3380	1456		3418	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	262	102	672	907	126	288	1297	377	52	1395	320
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	222	0	37	0
Lane Group Flow (vph)	118	361	0	672	1024	0	0	1585	155	0	1730	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			5			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm			
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4			
Actuated Green, G (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Effective Green, g (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Actuated g/C Ratio	0.05	0.17		0.26	0.39			0.41	0.41		0.41	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	181	564		877	1318			1388	598		1403	
v/s Ratio Prot	0.03	c0.11		0.20	c0.30							
v/s Ratio Perm								0.47	0.11		c0.51	
v/c Ratio	0.65	0.64		0.77	0.78			3.65dl	0.26		1.23	
Uniform Delay, d1	44.1	36.5		32.6	25.4			28.0	18.5		28.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	6.3	1.8		3.6	4.5			73.0	0.1		111.2	
Delay (s)	50.4	38.2		36.2	29.9			101.0	18.6		139.2	
Level of Service	D	D		D	C			F	B		F	
Approach Delay (s)		41.2			32.4			85.2			139.2	
Approach LOS		D			C			F			F	

Intersection Summary				
HCM Average Control Delay	82.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	117.8%	ICU Level of Service	H	
Analysis Period (min)	15			
dl Defacto Left Lane. Recode with 1 though lane as a left lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: Harrison St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations								
Volume (vph)	541	0	0	1299	0	632	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0		4.0		
Lane Util. Factor	0.94			0.91		*0.95		
Frt	1.00			1.00		1.00		
Flt Protected	0.95			1.00		1.00		
Satd. Flow (prot)	4802			4916		3539		
Flt Permitted	0.95			1.00		1.00		
Satd. Flow (perm)	4802			4916		3539		
Peak-hour factor, PHF	0.96	0.96	0.94	0.94	0.92	0.92	0.92	0.92
Adj. Flow (vph)	564	0	0	1382	0	687	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	564	0	0	1382	0	687	0	0
Heavy Vehicles (%)	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)				0		0		
Turn Type						custom		
Protected Phases	2			1		1		
Permitted Phases								
Actuated Green, G (s)	25.0			46.0		46.0		
Effective Green, g (s)	25.0			46.0		46.0		
Actuated g/C Ratio	0.31			0.57		0.57		
Clearance Time (s)	5.0			4.0		4.0		
Lane Grp Cap (vph)	1501			2827		2035		
v/s Ratio Prot	c0.12			c0.28		0.19		
v/s Ratio Perm								
v/c Ratio	0.38			0.49		0.34		
Uniform Delay, d1	21.4			10.0		9.0		
Progression Factor	0.57			1.00		0.72		
Incremental Delay, d2	0.5			0.6		0.3		
Delay (s)	12.8			10.7		6.7		
Level of Service	B			B		A		
Approach Delay (s)	12.8			10.7	6.7		0.0	
Approach LOS	B			B	A		A	

Intersection Summary				
HCM Average Control Delay	10.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	42.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	EBT	EBR	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	NBR2	SBR
Lane Configurations												
Volume (vph)	138	97	124	491	444	60	102	62	0	432	19	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	0.91	*0.95		0.91	0.91	1.00			0.95	0.95		1.00
Frpb, ped/bikes	1.00	0.88		1.00	1.00	1.00			1.00	0.91		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00
Frt	0.97	1.00		1.00	1.00	0.85			0.93	1.00		0.86
Flt Protected	1.00	1.00		0.95	0.99	1.00			0.97	1.00		1.00
Satd. Flow (prot)	3179	1361		1610	3251	1583			1600	1402		1611
Flt Permitted	1.00	1.00		0.95	0.80	1.00			0.97	1.00		1.00
Satd. Flow (perm)	3179	1361		1610	2654	1583			1600	1402		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	40	135	534	483	65	111	67	0	470	21	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	186	139	0	331	686	65	0	0	343	326	0	33
Confl. Peds. (#/hr)			70				70				70	
Confl. Bikes (#/hr)			16								16	
Heavy Vehicles (%)	6%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5								5		
Turn Type		Perm		Prot		Perm	Perm	Split		Perm		custom
Protected Phases	1			2	6			8	8			6
Permitted Phases		1				6	8			8		
Actuated Green, G (s)	20.0	20.0		17.0	29.0	29.0			23.0	23.0		8.0
Effective Green, g (s)	20.0	20.0		17.0	29.0	29.0			23.0	23.0		8.0
Actuated g/C Ratio	0.25	0.25		0.21	0.36	0.36			0.29	0.29		0.10
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Grp Cap (vph)	795	340		342	1069	574			460	403		161
v/s Ratio Prot	0.06			c0.21	0.13				0.21			0.02
v/s Ratio Perm		c0.10			c0.09	0.04				c0.23		
v/c Ratio	0.23	0.41		0.97	0.63	0.11			0.75	0.81		0.20
Uniform Delay, d1	23.9	25.1		31.2	21.1	17.0			25.8	26.5		33.1
Progression Factor	1.00	1.00		1.29	1.34	1.32			1.00	1.00		1.00
Incremental Delay, d2	0.7	3.8		33.1	1.9	0.3			10.6	16.0		2.9
Delay (s)	24.6	28.7		73.4	30.2	22.6			36.4	42.4		35.9
Level of Service	C	C		E	C	C			D	D		D
Approach Delay (s)	26.3				43.0				39.3			
Approach LOS	C				D				D			

Intersection Summary				
HCM Average Control Delay	47.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	70.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	SER2	NWL2	NWL	NWT
Lane Configurations				
Volume (vph)	10	25	111	56
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00
Frt	0.86	1.00	1.00	1.00
Flt Protected	1.00	0.95	0.95	0.98
Satd. Flow (prot)	1611	1770	1649	1729
Flt Permitted	1.00	0.95	0.95	0.98
Satd. Flow (perm)	1611	1770	1649	1729
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	27	121	61
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	11	27	90	92
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				
Heavy Vehicles (%)	2%	2%	4%	2%
Parking (#/hr)				
Turn Type	Free	Split	Split	
Protected Phases		7	7	7
Permitted Phases	Free			
Actuated Green, G (s)	80.0	4.0	4.0	4.0
Effective Green, g (s)	80.0	4.0	4.0	4.0
Actuated g/C Ratio	1.00	0.05	0.05	0.05
Clearance Time (s)		4.0	4.0	4.0
Lane Grp Cap (vph)	1611	89	82	86
v/s Ratio Prot		0.02	c0.05	0.05
v/s Ratio Perm	0.01			
v/c Ratio	0.01	0.30	1.10	1.07
Uniform Delay, d1	0.0	36.7	38.0	38.0
Progression Factor	1.00	0.77	0.78	0.78
Incremental Delay, d2	0.0	8.3	126.9	115.9
Delay (s)	0.0	36.4	156.4	145.4
Level of Service	A	D	F	F
Approach Delay (s)				136.1
Approach LOS				F

Intersection Summary

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	19	1	1210	395	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.95	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1510			3318	3068	
Flt Permitted	0.96			0.95	1.00	
Satd. Flow (perm)	1510			3168	3068	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92
Adj. Flow (vph)	201	21	1	1247	429	247
RTOR Reduction (vph)	8	0	0	0	126	0
Lane Group Flow (vph)	214	0	0	1248	550	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	537			1549	1500	
v/s Ratio Prot	c0.14				0.18	
v/s Ratio Perm				c0.39		
v/c Ratio	0.40			0.81	0.37	
Uniform Delay, d1	10.9			9.7	7.2	
Progression Factor	1.00			0.73	1.00	
Incremental Delay, d2	2.2			4.3	0.7	
Delay (s)	13.1			11.4	7.9	
Level of Service	B			B	A	
Approach Delay (s)	13.1			11.4	7.9	
Approach LOS	B			B	A	

Intersection Summary				
HCM Average Control Delay	10.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	52.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & Madison St 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	439	8	0	0	0	0	221	1209	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		3318						3318	3318		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		3318						3318	3318		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	477	9	0	0	0	0	240	1314	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	486	0	0	0	0	0	240	1314	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2.3		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		1253						1585	3060		
v/s Ratio Prot		0.15						0.07			
v/s Ratio Perm									c0.40		
v/c Ratio		0.39						0.15	0.43		
Uniform Delay, d1		10.2						6.6	0.2		
Progression Factor		1.04						1.20	1.00		
Incremental Delay, d2		0.9						0.0	0.0		
Delay (s)		17.6						8.0	0.3		
Level of Service		B						A	A		
Approach Delay (s)	17.6				0.0			1.5		0.0	
Approach LOS	B				A			A		A	

Intersection Summary				
HCM Average Control Delay	5.3	HCM Level of Service		A
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		3.0
Intersection Capacity Utilization	45.6%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	66	167	0	0	0	0	0	0	80	375	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.89									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2812									4779	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2812									4779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	182	0	0	0	0	0	0	87	408	0
RTOR Reduction (vph)	0	123	0	0	0	0	0	0	0	0	41	0
Lane Group Flow (vph)	0	131	0	0	0	0	0	0	0	0	454	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		908									2549	
v/s Ratio Prot		c0.05										
v/s Ratio Perm											0.10	
v/c Ratio		0.14									0.18	
Uniform Delay, d1		10.8									5.4	
Progression Factor		1.00									2.75	
Incremental Delay, d2		0.3									0.1	
Delay (s)		11.2									15.1	
Level of Service		B									B	
Approach Delay (s)		11.2			0.0			0.0			15.1	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	13.7	HCM Level of Service		B
HCM Volume to Capacity ratio	0.17			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	43.6%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	187	135	156	930	0	0	0	0	212	359	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		2983			3231					1265	3143	
Flt Permitted		1.00			0.84					0.95	1.00	
Satd. Flow (perm)		2983			2733					1265	3143	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	195	141	170	1011	0	0	0	0	228	386	0
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	261	0	0	1181	0	0	0	0	198	416	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1392			1275					478	1187	
v/s Ratio Prot		0.09										
v/s Ratio Perm					c0.43					c0.16	0.13	
v/c Ratio		0.19			0.93					0.41	0.35	
Uniform Delay, d1		7.0			11.3					10.3	10.0	
Progression Factor		1.00			1.59					1.55	1.51	
Incremental Delay, d2		0.3			1.5					2.6	0.8	
Delay (s)		7.3			19.4					18.6	15.9	
Level of Service		A			B					B	B	
Approach Delay (s)		7.3			19.4			0.0			16.8	
Approach LOS		A			B			A			B	

Intersection Summary				
HCM Average Control Delay	16.8	HCM Level of Service		B
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	68.5%	ICU Level of Service		C
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	379	0	0	1103	1036	139	476	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			3.5				
Lane Util. Factor		0.95			0.95			0.86				
Frpb, ped/bikes		1.00			0.95			1.00				
Flpb, ped/bikes		1.00			1.00			0.98				
Frt		1.00			0.93			0.99				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3187			3094			5891				
Flt Permitted		0.57			1.00			0.99				
Satd. Flow (perm)		1824			3094			5891				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	408	0	0	1161	1093	151	517	43	0	0	0
RTOR Reduction (vph)	0	0	0	0	66	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	469	0	0	2188	0	0	690	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm						Perm					
Protected Phases		1			1			2				
Permitted Phases	1						2					
Actuated Green, G (s)		19.5			19.5			17.0				
Effective Green, g (s)		19.5			19.5			17.0				
Actuated g/C Ratio		0.43			0.43			0.38				
Clearance Time (s)		5.0			5.0			3.5				
Lane Grp Cap (vph)		790			1341			2225				
v/s Ratio Prot					c0.71							
v/s Ratio Perm		0.26						0.12				
v/c Ratio		0.59			1.63			0.31				
Uniform Delay, d1		9.7			12.8			9.9				
Progression Factor		1.33			1.00			0.44				
Incremental Delay, d2		3.2			287.6			0.3				
Delay (s)		16.1			300.3			4.7				
Level of Service		B			F			A				
Approach Delay (s)		16.1			300.3			4.7			0.0	
Approach LOS		B			F			A			A	

Intersection Summary				
HCM Average Control Delay	200.3	HCM Level of Service		F
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	88.4%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	128	0	0	1352	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	0	0	1470	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	560	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	100	100			
cM capacity (veh/h)	456	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3
Volume Total	70	70	490	490	490
Volume Left	70	70	0	0	0
Volume Right	0	0	0	0	0
cSH	458	458	1700	1700	1700
Volume to Capacity	0.15	0.15	0.29	0.29	0.29
Queue Length 95th (ft)	13	13	0	0	0
Control Delay (s)	14.3	14.3	0.0	0.0	0.0
Lane LOS	B	B			
Approach Delay (s)	14.3		0.0		
Approach LOS	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	28	0	0	924	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	0	1004	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	321	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	637	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	30	251	251	251	251
Volume Left	30	0	0	0	0
Volume Right	0	0	0	0	0
cSH	637	1700	1700	1700	1700
Volume to Capacity	0.05	0.15	0.15	0.15	0.15
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑									↑↑↑	
Volume (vph)	0	447	90	0	0	0	0	0	0	85	497	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5938									4752	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5938									4752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	486	98	0	0	0	0	0	0	92	540	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	0	52	0
Lane Group Flow (vph)	0	532	0	0	0	0	0	0	0	0	580	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2771									1795	
v/s Ratio Prot		c0.09										
v/s Ratio Perm											0.12	
v/c Ratio		0.19									0.32	
Uniform Delay, d1		7.0									9.9	
Progression Factor		1.00									1.35	
Incremental Delay, d2		0.2									0.4	
Delay (s)		7.2									13.8	
Level of Service		A									B	
Approach Delay (s)		7.2			0.0			0.0			13.8	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	10.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	32.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑↑				
Volume (vph)	45	344	0	0	0	0	0	647	175	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0				
Lane Util. Factor	1.00	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.98				
Flpb, ped/bikes	0.98	1.00						1.00				
Frt	1.00	1.00						0.97				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	1512	4873						5864				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	1512	4873						5864				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	374	0	0	0	0	0	703	190	0	0	0
RTOR Reduction (vph)	27	0	0	0	0	0	0	109	0	0	0	0
Lane Group Flow (vph)	22	374	0	0	0	0	0	784	0	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm											
Protected Phases		2						1				
Permitted Phases	2											
Actuated Green, G (s)	20.5	20.5						18.0				
Effective Green, g (s)	20.5	20.5						18.0				
Actuated g/C Ratio	0.46	0.46						0.40				
Clearance Time (s)	3.5	3.5						3.0				
Lane Grp Cap (vph)	689	2220						2346				
v/s Ratio Prot		c0.08						c0.13				
v/s Ratio Perm	0.01											
v/c Ratio	0.03	0.17						0.33				
Uniform Delay, d1	6.8	7.2						9.4				
Progression Factor	0.84	0.84						2.60				
Incremental Delay, d2	0.1	0.2						0.3				
Delay (s)	5.8	6.2						24.6				
Level of Service	A	A						C				
Approach Delay (s)		6.2			0.0			24.6			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	18.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	49.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑						↑↑↑↑	
Volume (vph)	0	0	0	644	1550	0	0	0	0	0	591	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5899						4669	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5899						4669	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	700	1685	0	0	0	0	0	642	113
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	2324	0	0	0	0	0	751	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					6						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1764	
v/s Ratio Prot											c0.16	
v/s Ratio Perm					0.39							
v/c Ratio					0.92dl						0.43	
Uniform Delay, d1					10.6						10.4	
Progression Factor					0.24						1.64	
Incremental Delay, d2					1.6						0.7	
Delay (s)					4.1						17.8	
Level of Service					A						B	
Approach Delay (s)		0.0			4.1			0.0			17.8	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	7.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	56.8%	ICU Level of Service	B	
Analysis Period (min)	15			
dl Defacto Left Lane. Recode with 1 though lane as a left lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	2060	88	203	712	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5946			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5946			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2215	95	218	766	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2297	0	0	983	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					2511			2305				
v/s Ratio Prot					c0.39							
v/s Ratio Perm								c0.17				
v/c Ratio					0.91			0.43				
Uniform Delay, d1					12.2			10.1				
Progression Factor					1.00			1.70				
Incremental Delay, d2					6.6			0.5				
Delay (s)					18.8			17.6				
Level of Service					B			B				
Approach Delay (s)		0.0			18.8			17.6			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	18.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	52.4%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St 5/23/2007

Movement	SBL	SBT	SEL	SET	SER
Lane Configurations		↰↑↑	↰	↑↑↑↱	
Volume (vph)	64	1149	28	360	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.95	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4802	1548	4396	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4802	1548	4396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	1249	30	380	189
RTOR Reduction (vph)	0	0	0	7	0
Lane Group Flow (vph)	0	1319	30	562	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1814	619	1758	
v/s Ratio Prot			0.02	c0.13	
v/s Ratio Perm		0.27			
v/c Ratio		0.73	0.05	0.32	
Uniform Delay, d1		12.0	8.3	9.3	
Progression Factor		1.23	1.00	1.00	
Incremental Delay, d2		2.0	0.1	0.5	
Delay (s)		16.7	8.4	9.8	
Level of Service		B	A	A	
Approach Delay (s)		16.7		9.7	
Approach LOS		B		A	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↱	
Volume (vph)	0	0	0	173	475	0	0	0	0	107	1282	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3176						4741	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3176						4741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	188	516	0	0	0	0	116	1393	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	704	0	0	0	0	0	1585	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1129						2423	
v/s Ratio Prot												
v/s Ratio Perm					0.22						0.33	
v/c Ratio					0.62						0.65	
Uniform Delay, d1					12.0						8.1	
Progression Factor					1.13						0.32	
Incremental Delay, d2					0.2						1.1	
Delay (s)					13.6						3.7	
Level of Service					B						A	
Approach Delay (s)		0.0			13.6			0.0			3.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑			↱			↰↑↑↑				
Volume (vph)	9	61	0	0	524	150	114	773	103	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3291			1552			5969				
Flt Permitted		0.73			1.00			0.99				
Satd. Flow (perm)		2424			1552			5969				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	66	0	0	570	163	124	840	112	0	0	0
RTOR Reduction (vph)	0	0	0	0	23	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	76	0	0	710	0	0	1032	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		808			517			2918				
v/s Ratio Prot					c0.46							
v/s Ratio Perm		0.03						0.17				
v/c Ratio		0.09			1.37			0.35				
Uniform Delay, d1		10.3			15.0			7.1				
Progression Factor		1.79			1.00			0.72				
Incremental Delay, d2		0.2			180.2			0.3				
Delay (s)		18.7			195.2			5.4				
Level of Service		B			F			A				
Approach Delay (s)		18.7			195.2			5.4			0.0	
Approach LOS		B			F			A			A	

Intersection Summary			
HCM Average Control Delay	79.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	343	780	0	0	0	0	0	1493	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					5972						4771	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					5972						4771	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	373	848	0	0	0	0	0	1623	100
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	1215	0	0	0	0	0	1708	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2256						2226	
v/s Ratio Prot											c0.36	
v/s Ratio Perm					0.20							
v/c Ratio					0.54						0.77	
Uniform Delay, d1					10.9						10.0	
Progression Factor					1.28						0.85	
Incremental Delay, d2					0.8						2.1	
Delay (s)					14.9						10.6	
Level of Service					B						B	
Approach Delay (s)		0.0			14.9			0.0			10.6	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	946	100	203	1084	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6037			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6037			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1028	109	221	1178	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1122	0	0	1379	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2415			2563				
v/s Ratio Prot					c0.19							
v/s Ratio Perm								0.23				
v/c Ratio					0.46			0.54				
Uniform Delay, d1					9.9			9.7				
Progression Factor					1.00			2.05				
Incremental Delay, d2					0.6			0.4				
Delay (s)					10.6			20.4				
Level of Service					B			C				
Approach Delay (s)		0.0			10.6			20.4			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM Average Control Delay	16.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	41.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	647	564	0	0	0	0	0	0	270	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.97									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.93									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5561									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5561									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	703	613	0	0	0	0	0	0	293	1715	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	1314	0	0	0	0	0	0	0	0	1955	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2472									1904	
v/s Ratio Prot		c0.24										
v/s Ratio Perm											0.41	
v/c Ratio		1.04dr									1.03	
Uniform Delay, d1		9.1									13.5	
Progression Factor		1.00									1.77	
Incremental Delay, d2		0.8									24.3	
Delay (s)		9.9									48.2	
Level of Service		A									D	
Approach Delay (s)		9.9			0.0			0.0			48.2	
Approach LOS		A			A			A			D	

Intersection Summary				
HCM Average Control Delay	33.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	63.8%	ICU Level of Service	B	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	739	0	0	0	0	0	1211	310	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6062						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6062						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	803	0	0	0	0	0	1316	337	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	959	0	0	0	0	0	1608	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2425						1846				
v/s Ratio Prot								c0.35				
v/s Ratio Perm		0.16										
v/c Ratio		0.40						0.87				
Uniform Delay, d1		9.6						12.4				
Progression Factor		1.19						1.00				
Incremental Delay, d2		0.4						6.0				
Delay (s)		11.8						18.4				
Level of Service		B						B				
Approach Delay (s)		11.8			0.0			18.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	16.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	51.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	11	293	378	520	468	376	506	197	79	671	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.98			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1617	1441	1736	3539	1286	1610	2970			3511	1297
Flt Permitted		0.39	1.00	0.63	1.00	1.00	0.95	0.89			0.76	1.00
Satd. Flow (perm)		648	1441	1143	3539	1286	1610	2661			2690	1297
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	12	318	411	565	509	406	544	212	85	722	334
RTOR Reduction (vph)	0	11	200	0	0	190	0	38	0	0	0	30
Lane Group Flow (vph)	0	135	86	411	565	319	365	759	0	0	807	304
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		194	432	343	1062	386	242	1643			1091	526
v/s Ratio Prot					0.16		c0.23	0.07				
v/s Ratio Perm		0.21	0.06	c0.36		0.25		0.21			c0.30	0.23
v/c Ratio		0.69	0.20	1.20	0.53	0.83	1.51	0.46			0.74	0.58
Uniform Delay, d1		27.9	23.4	31.5	26.2	29.3	38.2	10.0			22.7	20.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.88	2.89			1.00	1.00
Incremental Delay, d2		18.6	1.0	114.0	1.9	18.1	243.3	0.7			4.5	4.6
Delay (s)		46.5	24.5	145.5	28.1	47.4	277.1	29.4			27.2	25.3
Level of Service		D	C	F	C	D	F	C			C	C
Approach Delay (s)		31.9			67.2			107.2			26.7	
Approach LOS		C			E			F			C	

Intersection Summary				
HCM Average Control Delay	63.7	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	99.4%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	266	666	566	0	0	0	0	656	620	665	622	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.95						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4458						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4458						3539	1296	1770	3318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	289	941	615	0	0	0	0	691	653	723	676	0
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1745	0	0	0	0	0	691	653	723	676	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1486						1003	1296	423	1880	
v/s Ratio Prot								c0.20		c0.41		
v/s Ratio Perm		0.39							0.50		0.20	
v/c Ratio		1.17						0.69	0.50	1.71	0.36	
Uniform Delay, d1		30.0						28.7	0.0	34.2	10.6	
Progression Factor		1.00						1.00	1.00	1.35	0.95	
Incremental Delay, d2		85.9						3.9	1.4	324.7	0.3	
Delay (s)		115.9						32.6	1.4	370.9	10.4	
Level of Service		F						C	A	F	B	
Approach Delay (s)		115.9			0.0			17.4			196.7	
Approach LOS		F			A			B			F	

Intersection Summary				
HCM Average Control Delay	111.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	102.4%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	275	208	1040	0	0	1126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	5.0			5.0
Lane Util. Factor	0.97	0.91	0.95			0.95
Frpb, ped/bikes	0.99	0.97	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	0.97	0.85	1.00			1.00
Flt Protected	0.96	1.00	1.00			1.00
Satd. Flow (prot)	3351	1398	3318			3318
Flt Permitted	0.96	1.00	1.00			1.00
Satd. Flow (perm)	3351	1396	3318			3318
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	299	226	1095	0	0	1224
RTOR Reduction (vph)	27	57	0	0	0	0
Lane Group Flow (vph)	333	108	1095	0	0	1224
Confl. Peds. (#/hr)		17				
Confl. Bikes (#/hr)		2				
Parking (#/hr)			5			5
Turn Type		Perm				
Protected Phases	4		6			6
Permitted Phases		4				
Actuated Green, G (s)	17.2	17.2	53.8			53.8
Effective Green, g (s)	17.2	17.2	53.8			53.8
Actuated g/C Ratio	0.22	0.22	0.67			0.67
Clearance Time (s)	4.0	4.0	5.0			5.0
Vehicle Extension (s)	2.0	2.0	2.0			2.0
Lane Grp Cap (vph)	720	300	2231			2231
v/s Ratio Prot	c0.10		0.33			c0.37
v/s Ratio Perm		0.08				
v/c Ratio	0.46	0.36	0.49			0.55
Uniform Delay, d1	27.4	26.7	6.4			6.8
Progression Factor	1.00	1.00	0.09			1.00
Incremental Delay, d2	0.2	0.3	0.3			1.0
Delay (s)	27.5	27.0	0.9			7.8
Level of Service	C	C	A			A
Approach Delay (s)	27.4		0.9			7.8
Approach LOS	C		A			A

Intersection Summary				
HCM Average Control Delay	8.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	109.7%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
4: El Embarcadero EB & Grand Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1040	678	349	1052
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			5.0		4.0	4.0
Lane Util. Factor			0.95		1.00	0.95
Frpb, ped/bikes			0.93		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			0.94		1.00	1.00
Flt Protected			1.00		0.95	1.00
Satd. Flow (prot)			3110		1768	3362
Flt Permitted			1.00		0.13	1.00
Satd. Flow (perm)			3110		235	3362
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	0	1095	714	379	1143
RTOR Reduction (vph)	0	0	103	0	0	0
Lane Group Flow (vph)	0	0	1706	0	379	1143
Confl. Peds. (#/hr)	70			88	86	
Confl. Bikes (#/hr)				25		
Parking (#/hr)				5		0
Turn Type					custom	
Protected Phases			2		1	1 6 7
Permitted Phases					1 4 6 7	
Actuated Green, G (s)			44.8		76.0	68.8
Effective Green, g (s)			44.8		76.0	68.8
Actuated g/C Ratio			0.56		0.95	0.86
Clearance Time (s)			5.0		4.0	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)			1742		319	2891
v/s Ratio Prot			0.55		c0.07	0.34
v/s Ratio Perm					c1.05	
v/c Ratio			0.98		1.19	0.40
Uniform Delay, d1			17.1		3.0	1.2
Progression Factor			1.00		1.17	0.55
Incremental Delay, d2			17.1		109.3	0.0
Delay (s)			34.3		112.8	0.7
Level of Service			C		F	A
Approach Delay (s)	0.0		34.3			28.6
Approach LOS	A		C			C

Intersection Summary				
HCM Average Control Delay	31.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	1.15			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	109.7%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	0	169	413	920	214	279	486	0	0	360	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.68			1.00	0.90	1.00	1.00			0.88	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.94	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	906			3485	1247	1770	3539			2751	
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	906			3485	1247	1770	3539			2751	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	0	205	444	989	230	303	528	0	0	391	236
RTOR Reduction (vph)	0	191	0	0	0	73	0	0	0	0	87	0
Lane Group Flow (vph)	103	26	0	0	1433	157	303	526	0	0	540	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	7.0	7.0			43.0	43.0	17.0	42.8			21.8	
Effective Green, g (s)	7.0	7.0			43.0	43.0	17.0	42.8			21.8	
Actuated g/C Ratio	0.07	0.07			0.41	0.41	0.16	0.41			0.21	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	113	61			1437	514	288	1452			575	
v/s Ratio Prot	c0.06	0.03			c0.41		c0.17	0.15			c0.20	
v/s Ratio Perm						0.13						
v/c Ratio	0.91	0.42			1.00	0.31	1.05	0.36			0.94	
Uniform Delay, d1	48.3	46.7			30.6	20.6	43.6	21.3			40.6	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	56.7	1.7			23.1	1.5	67.4	0.1			23.0	
Delay (s)	105.1	48.4			53.7	22.1	111.0	21.4			63.6	
Level of Service	F	D			D	C	F	C			E	
Approach Delay (s)		66.7			49.3			54.1			63.6	
Approach LOS		E			D			D			E	

Intersection Summary				
HCM Average Control Delay	54.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	104.3	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	99.8%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	1711	168	0	0	0	0	470	929	476	597	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00						0.92		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.99						0.90		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1411	4714						2749		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.10	1.00	
Satd. Flow (perm)	1411	4714						2749		180	3539	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	276	1820	179	0	0	0	0	495	978	517	649	0
RTOR Reduction (vph)	0	12	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	248	2015	0	0	0	0	0	1470	0	517	649	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm										pm+pt	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1467						1161		309	2084	
v/s Ratio Prot								0.53		c0.21	0.18	
v/s Ratio Perm	0.18	0.43								c0.77		
v/c Ratio	0.56	1.37						1.27 dr		1.67	0.31	
Uniform Delay, d1	25.9	31.0						26.0		27.4	9.3	
Progression Factor	1.14	1.10						1.00		1.00	1.00	
Incremental Delay, d2	0.5	168.6						126.6		316.8	0.4	
Delay (s)	29.9	202.8						152.6		344.2	9.7	
Level of Service	C	F						F		F	A	
Approach Delay (s)		183.9			0.0			152.6			158.0	
Approach LOS		F			A			F			F	

Intersection Summary				
HCM Average Control Delay	168.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.54			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	117.2%	ICU Level of Service	H	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1028	0	0	1100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			3318			3318
Flt Permitted			1.00			1.00
Satd. Flow (perm)			3318			3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	0	1117	0	0	1158
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1117	0	0	1158
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2800			2800
v/s Ratio Prot			0.34			c0.35
v/s Ratio Perm						
v/c Ratio			0.40			0.41
Uniform Delay, d1			2.2			2.3
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.0
Delay (s)			2.2			2.3
Level of Service			A			A
Approach Delay (s)	0.0		2.2			2.3
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	33.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	32	135	954	80	134	842
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.89		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.99		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1285		3249		1770	3318
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1285		3249		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	147	1037	87	146	915
RTOR Reduction (vph)	129	0	9	0	0	0
Lane Group Flow (vph)	53	0	1115	0	146	915
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.1		20.4		6.4	30.8
Effective Green, g (s)	5.1		20.4		6.4	30.8
Actuated g/C Ratio	0.12		0.49		0.15	0.74
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	156		1582		270	2439
v/s Ratio Prot	c0.04		c0.34		c0.08	0.28
v/s Ratio Perm						
v/c Ratio	0.34		0.70		0.54	0.38
Uniform Delay, d1	16.9		8.4		16.4	2.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		1.2		1.2	0.0
Delay (s)	17.3		9.6		17.6	2.1
Level of Service	B		A		B	A
Approach Delay (s)	17.3		9.6			4.2
Approach LOS	B		A			A

Intersection Summary				
HCM Average Control Delay	7.8	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	60.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av 5/23/2007

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis
8: El Embarcadero EB & Lakeshore Av 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	415	612	0	980	476	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.95	0.93	0.93
Hourly flow rate (vph)	451	665	0	1032	512	0
Pedestrians				7	8	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				763		
pX, platoon unblocked	0.98					
vC, conflicting volume	1036	263	512			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994	263	512			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	9	100			
cM capacity (veh/h)	235	731	1050			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	301	816	516	516	256	256
Volume Left	301	150	0	0	0	0
Volume Right	0	665	0	0	0	0
cSH	235	527	1700	1700	1700	1700
Volume to Capacity	1.28	1.55	0.30	0.30	0.15	0.15
Queue Length 95th (ft)	387	1080	0	0	0	0
Control Delay (s)	195.9	276.8	0.0	0.0	0.0	0.0
Lane LOS	F	F				
Approach Delay (s)	255.0		0.0		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	107.0		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	26	1026	0	13	1099
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.94	0.94
Hourly flow rate (vph)	1	28	1117	0	14	1169
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.93	0.93			0.93	
vC, conflicting volume	1829	592			1146	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1740	409			1006	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			98	
cM capacity (veh/h)	65	535			621	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	29	745	372	404	779
Volume Left	1	0	0	14	0
Volume Right	28	0	0	0	0
cSH	422	1700	1700	621	1700
Volume to Capacity	0.07	0.44	0.22	0.02	0.46
Queue Length 95th (ft)	6	0	0	2	0
Control Delay (s)	14.2	0.0	0.0	0.7	0.0
Lane LOS	B			A	
Approach Delay (s)	14.2	0.0		0.2	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	5	993	13	27	981
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	5	1079	14	29	1066
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.84	0.83			0.83	
vC, conflicting volume	1695	560			1104	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1276	43			703	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			96	
cM capacity (veh/h)	126	631			728	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	12	720	374	29	533	533
Volume Left	7	0	0	29	0	0
Volume Right	5	0	14	0	0	0
cSH	205	1700	1700	728	1700	1700
Volume to Capacity	0.06	0.42	0.22	0.04	0.31	0.31
Queue Length 95th (ft)	5	0	0	3	0	0
Control Delay (s)	23.6	0.0	0.0	10.2	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	23.6	0.0		0.3		
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	32	67	976	101	141	853
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.97		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1413		3251		1770	3318
Flt Permitted	0.98		1.00		0.15	1.00
Satd. Flow (perm)	1413		3251		287	3318
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.92	0.92
Adj. Flow (vph)	35	73	1048	109	153	927
RTOR Reduction (vph)	46	0	13	0	0	0
Lane Group Flow (vph)	62	0	1144	0	153	927
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					pm+pt	
Protected Phases	7		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	22.0		22.0		31.0	31.0
Effective Green, g (s)	22.0		22.0		31.0	31.0
Actuated g/C Ratio	0.37		0.37		0.52	0.52
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	518		1192		272	1714
v/s Ratio Prot	c0.04		c0.35		0.05	c0.28
v/s Ratio Perm					0.24	
v/c Ratio	0.12		0.96		0.56	0.54
Uniform Delay, d1	12.6		18.6		11.6	9.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		18.0		8.2	1.2
Delay (s)	13.1		36.6		19.8	11.0
Level of Service	B		D		B	B
Approach Delay (s)	13.1		36.6			12.2
Approach LOS	B		D			B

Intersection Summary				
HCM Average Control Delay	24.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

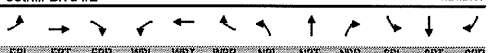
HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	362	200	831	576	371	639
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		0.91	0.91	1.00	0.95
Frpb, ped/bikes	0.97		0.99	0.94	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.95		0.98	0.85	1.00	1.00
Flt Protected	0.97		1.00	1.00	0.95	1.00
Satd. Flow (prot)	3182		3279	1347	1770	3316
Flt Permitted	0.97		1.00	1.00	0.95	1.00
Satd. Flow (perm)	3182		3279	1347	1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	393	217	903	626	403	695
RTOR Reduction (vph)	101	0	18	313	0	0
Lane Group Flow (vph)	509	0	1048	150	403	695
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)						5
Turn Type				Perm	Prot	
Protected Phases	4		2		1	
Permitted Phases				2		6
Actuated Green, G (s)	26.0		26.0	26.0	19.0	48.0
Effective Green, g (s)	26.0		26.0	26.0	19.0	48.0
Actuated g/C Ratio	0.32		0.32	0.32	0.24	0.60
Clearance Time (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1034		1066	438	420	1991
v/s Ratio Prot	c0.16		c0.32		c0.23	
v/s Ratio Perm				0.11		0.21
v/c Ratio	0.49		0.98	0.34	0.96	0.35
Uniform Delay, d1	21.7		26.8	20.5	30.1	8.1
Progression Factor	1.00		1.54	7.43	1.00	1.00
Incremental Delay, d2	1.7		22.2	1.9	34.9	0.5
Delay (s)	23.4		63.5	154.2	65.0	8.6
Level of Service	C		E	F	E	A
Approach Delay (s)	23.4		91.0			29.3
Approach LOS	C		F			C

Intersection Summary				
HCM Average Control Delay	57.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	80.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Lakeshore Av & Foothill Blvd #2 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	218	168	0	1333	0	0	0	883
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5			3.0				3.0
Lane Util. Factor					0.95			0.91				*0.91
Frpb, ped/bikes					0.98			1.00				1.00
Flpb, ped/bikes					1.00			1.00				1.00
Frt					0.93			1.00				1.00
Flt Protected					1.00			1.00				1.00
Satd. Flow (prot)					2996			4690				4893
Flt Permitted					1.00			1.00				1.00
Satd. Flow (perm)					2996			4690				4893
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	234	181	0	1433	0	0	0	960
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	0	326
Lane Group Flow (vph)	0	0	0	0	385	0	0	1433	0	0	0	634
Confl. Peds. (#/hr)						42						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	6%	2%	2%	2%	6%
Parking (#/hr)		0			5			5				
Turn Type												custom
Protected Phases					2			1				
Permitted Phases												1
Actuated Green, G (s)					25.5			48.0				48.0
Effective Green, g (s)					25.5			48.0				48.0
Actuated g/C Ratio					0.32			0.60				0.60
Clearance Time (s)					3.5			3.0				3.0
Lane Grp Cap (vph)					955			2814				2936
v/s Ratio Prot					c0.13			c0.31				
v/s Ratio Perm												0.13
v/c Ratio					0.40			0.51				0.22
Uniform Delay, d1					21.3			9.2				7.4
Progression Factor					1.00			1.40				3.17
Incremental Delay, d2					1.3			0.2				0.2
Delay (s)					22.6			13.1				23.4
Level of Service					C			B				C
Approach Delay (s)		0.0			22.6			13.1			23.4	
Approach LOS		A			C			B			C	

Intersection Summary				
HCM Average Control Delay	18.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	52.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

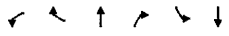
HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	254	254	0	0	0	0	1344	310	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.5				
Lane Util. Factor		0.95						0.95				
Frpb, ped/bikes		0.93						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		0.92						0.97				
Flt Protected		1.00						1.00				
Satd. Flow (prot)		2829						3097				
Flt Permitted		1.00						1.00				
Satd. Flow (perm)		2829						3097				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	276	276	0	0	0	0	1461	337	0	0	0
RTOR Reduction (vph)	0	183	0	0	0	0	0	25	0	0	0	0
Lane Group Flow (vph)	0	369	0	0	0	0	0	1773	0	0	0	0
Confl. Peds. (#/hr)			70						26			
Confl. Bikes (#/hr)			16						9			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	6%	4%	2%	2%	2%
Parking (#/hr)		0			0			5			0	
Turn Type												
Protected Phases		2						1				
Permitted Phases												
Actuated Green, G (s)		27.0						46.0				
Effective Green, g (s)		27.0						46.0				
Actuated g/C Ratio		0.34						0.57				
Clearance Time (s)		3.5						3.5				
Lane Grp Cap (vph)		955						1781				
v/s Ratio Prot		c0.13						c0.57				
v/s Ratio Perm												
v/c Ratio		0.39						1.00				
Uniform Delay, d1		20.2						16.9				
Progression Factor		1.24						1.00				
Incremental Delay, d2		1.1						20.3				
Delay (s)		26.2						37.2				
Level of Service		C						D				
Approach Delay (s)		26.2			0.0			37.2			0.0	
Approach LOS		C			A			D			A	

Intersection Summary				
HCM Average Control Delay	34.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	75.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

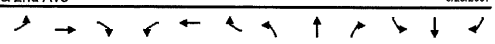


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	1309	35	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1423	38	0	0
Pedestrians	70					70
Lane Width (ft)	12.0					0.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			219			149
pX, platoon unblocked						
vC, conflicting volume	1512	633			1531	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1512	633			1531	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	93			100	
cM capacity (veh/h)	104	398			406	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3
Volume Total	26	569	569	323
Volume Left	0	0	0	0
Volume Right	26	0	0	38
cSH	398	1700	1700	1700
Volume to Capacity	0.07	0.33	0.33	0.19
Queue Length 95th (ft)	5	0	0	0
Control Delay (s)	14.7	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	14.7	0.0		
Approach LOS	B			

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	45.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

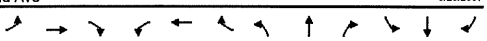


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	27	273	13	58	143	0	0	18	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	29	297	14	63	155	0	0	20	34
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	312			15			301	386	15	441	379	191
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312			15			301	386	15	441	379	191
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	71	100	100	96	96
cM capacity (veh/h)	1244			1581			565	530	1047	377	535	817

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	178	162	218	53
Volume Left	29	0	63	0
Volume Right	0	14	0	34
cSH	1581	1700	539	684
Volume to Capacity	0.02	0.10	0.41	0.08
Queue Length 95th (ft)	1	0	49	6
Control Delay (s)	1.3	0.0	16.1	10.7
Lane LOS	A		C	B
Approach Delay (s)	0.7		16.1	10.7
Approach LOS			C	B

Intersection Summary				
Average Delay	7.1			
Intersection Capacity Utilization	33.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

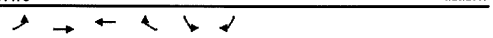


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	531	33	0	0	0	0	227	16	10	35	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	577	36	0	0	0	0	247	17	11	38	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	4			619			688	672	318	506	690	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			318			395	378	0	190	398	4
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	48	98	97	92	100
cM capacity (veh/h)	1611			1095			437	476	958	379	464	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	322	324	264	49
Volume Left	34	0	0	11
Volume Right	0	36	17	0
cSH	1611	1700	493	442
Volume to Capacity	0.02	0.19	0.54	0.11
Queue Length 95th (ft)	2	0	78	9
Control Delay (s)	0.9	0.0	20.4	14.2
Lane LOS	A		C	B
Approach Delay (s)	0.5		20.4	14.2
Approach LOS			C	B

Intersection Summary				
Average Delay	6.7			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	53	293	374	40	44	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	407	43	48	38
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520				1002	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				1002	568
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				79	92
cM capacity (veh/h)	985				224	463

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	376	450	86
Volume Left	58	0	48
Volume Right	0	43	38
cSH	985	1700	291
Volume to Capacity	0.06	0.26	0.30
Queue Length 95th (ft)	5	0	30
Control Delay (s)	1.9	0.0	22.5
Lane LOS	A		C
Approach Delay (s)	1.9	0.0	22.5
Approach LOS			C

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

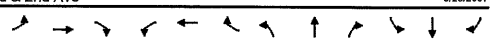
HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	314	76	1586	626	0	276
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.5	4.0		3.5
Lane Util. Factor	0.97		0.91	0.91		1.00
Frpb, ped/bikes	0.97		1.00	0.98		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		0.99	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3231		3242	1382		1568
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3231		3242	1382		1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	341	85	1724	680	0	300
RTOR Reduction (vph)	3	0	3	0	0	0
Lane Group Flow (vph)	423	0	1789	612	0	300
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				5
Turn Type				Free		
Protected Phases	2					
Permitted Phases			1	Free		1
Actuated Green, G (s)	45.0		45.0	97.0		45.0
Effective Green, g (s)	45.0		45.0	97.0		45.0
Actuated g/C Ratio	0.46		0.46	1.00		0.46
Clearance Time (s)	3.5		3.5			3.5
Lane Grp Cap (vph)	1499		1504	1382		727
v/s Ratio Prot	0.13					
v/s Ratio Perm			c0.55	c0.44		0.19
v/c Ratio	0.28		1.19	0.44		0.41
Uniform Delay, d1	16.0		26.0	0.0		17.2
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.5		92.3	1.0		1.7
Delay (s)	16.5		118.3	1.0		19.0
Level of Service	B		F	A		B
Approach Delay (s)	16.5		88.5			19.0
Approach LOS	B		F			B

Intersection Summary				
HCM Average Control Delay	72.0	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	3.5	
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

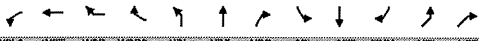


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	477	61	51	147	19	159	260	251	7	37	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.96			0.95	
Flpb, ped/bikes		1.00			1.00			0.98			1.00	
Frt		0.99			0.99			0.95			0.94	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		3158			3155			1439			1447	
Flt Permitted		0.87			0.72			0.90			0.95	
Satd. Flow (perm)		2780			2310			1310			1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	518	66	55	160	21	173	283	273	8	40	39
RTOR Reduction (vph)	0	22	0	0	14	0	0	14	0	0	16	0
Lane Group Flow (vph)	0	647	0	0	222	0	0	715	0	0	71	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		26.0			26.0			48.0			48.0	
Effective Green, g (s)		26.0			26.0			48.0			48.0	
Actuated g/C Ratio		0.32			0.32			0.60			0.60	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		904			751			786			832	
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.10			c0.55			0.05	
v/c Ratio		0.72			0.30			0.91			0.09	
Uniform Delay, d1		23.7			20.2			14.1			6.7	
Progression Factor		1.00			1.00			1.00			0.93	
Incremental Delay, d2		2.3			0.1			16.4			0.2	
Delay (s)		26.0			20.2			30.5			6.4	
Level of Service		C			C			C			A	
Approach Delay (s)		26.0			20.2			30.5			6.4	
Approach LOS		C			C			C			A	

Intersection Summary				
HCM Average Control Delay	26.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	130.3%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007



Movement	WBL2	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2	NEL	NER
Lane Configurations												
Volume (vph)	22	143	0	133	7	85	9	116	67	22	410	821
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Util. Factor		0.95	1.00			1.00			1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	0.90			0.99			1.00	0.92	1.00	1.00
Flpb, ped/bikes		0.99	1.00			0.99			0.96	1.00	0.95	1.00
Frt		1.00	0.85			0.99			1.00	0.85	0.95	1.00
Flt Protected		0.99	1.00			1.00			0.97	1.00	0.97	1.00
Satd. Flow (prot)		3481	1243			1582			1742	1266	1627	1770
Flt Permitted		0.99	1.00			0.98			0.74	1.00	0.97	1.00
Satd. Flow (perm)		3481	1243			1551			1335	1266	1627	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	155	0	145	8	92	10	126	73	24	446	892
RTOR Reduction (vph)	0	0	71	0	0	6	0	0	0	0	0	0
Lane Group Flow (vph)	0	179	74	0	0	104	0	0	199	24	696	642
Confl. Peds. (#/hr)	70			70	70		70	70		70	70	
Confl. Bikes (#/hr)				16			16			16		
Parking (#/hr)			5			5				5		
Turn Type	Perm		Perm		Perm		Perm		Perm			custom
Protected Phases		1				2			2			
Permitted Phases	1		1		2			2		2	1	1
Actuated Green, G (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Effective Green, g (s)		33.0	33.0			23.0			23.0	23.0	33.0	33.0
Actuated g/C Ratio		0.51	0.51			0.35			0.35	0.35	0.51	0.51
Clearance Time (s)		3.0	3.0			6.0			6.0	6.0	3.0	3.0
Lane Grp Cap (vph)		1767	631			549			472	449	826	899
v/s Ratio Prot												
v/s Ratio Perm		0.05	0.06			0.07			c0.15	0.02	c0.43	0.36
v/c Ratio		0.10	0.12			0.19			0.42	0.05	0.84	0.71
Uniform Delay, d1		8.3	8.4			14.5			15.9	13.8	13.8	12.4
Progression Factor		1.94	1.00			1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	0.3			0.8			2.8	0.2	10.2	4.8
Delay (s)		16.2	8.7			15.3			18.7	14.1	24.0	17.2
Level of Service		B	A			B			B	B	C	B
Approach Delay (s)		12.9				15.3			18.2		20.6	
Approach LOS		B				B			B		C	

Intersection Summary				
HCM Average Control Delay	18.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	96.4%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: E 12th Street & 2nd Ave 5/23/2007

Movement	NER2
Lane Configurations	
Volume (vph)	10
Ideal Flow (vphpl)	1900
Total Lost time (s)	3.0
Lane Util. Factor	1.00
Frpb, ped/bikes	0.90
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1421
Flt Permitted	1.00
Satd. Flow (perm)	1421
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	11
RTOR Reduction (vph)	0
Lane Group Flow (vph)	11
Confl. Peds. (#/hr)	70
Confl. Bikes (#/hr)	16
Parking (#/hr)	
Turn Type	custom
Protected Phases	
Permitted Phases	1
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.51
Clearance Time (s)	3.0
Lane Grp Cap (vph)	721
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.02
Uniform Delay, d1	7.9
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	8.0
Level of Service	A
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↑			↓	
Volume (vph)	0	0	0	74	304	48	52	354	0	0	267	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3187			1655			1657	
Flt Permitted					0.99			0.93			1.00	
Satd. Flow (perm)					3187			1547			1657	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	80	330	52	57	385	0	0	290	15
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	447	0	0	442	0	0	302	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1324			750			803	
v/s Ratio Prot											0.18	
v/s Ratio Perm					0.14			c0.29				
v/c Ratio					0.34			0.59			0.38	
Uniform Delay, d1					12.9			12.1			10.6	
Progression Factor					1.00			1.41			1.00	
Incremental Delay, d2					0.7			2.1			1.3	
Delay (s)					13.6			19.1			11.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.6			19.1			11.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	15.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	25	571	45	49	529	81	69	343	70	72	355	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3292			3238			1611			1644	
Flt Permitted		0.92			0.87			0.88			0.85	
Satd. Flow (perm)		3028			2826			1430			1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	621	49	53	575	88	75	373	76	78	386	20
RTOR Reduction (vph)	0	9	0	0	17	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	688	0	0	699	0	0	514	0	0	482	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1374			1283			616			609	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.25			c0.36			0.34	
v/c Ratio		0.50			0.54			0.83			0.79	
Uniform Delay, d1		12.5			12.9			16.4			16.0	
Progression Factor		1.00			1.00			0.91			0.71	
Incremental Delay, d2		1.3			1.7			1.3			9.9	
Delay (s)		13.9			14.5			16.2			21.2	
Level of Service		B			B			B			C	
Approach Delay (s)		13.9			14.5			16.2			21.2	
Approach LOS		B			B			B			C	

Intersection Summary				
HCM Average Control Delay	16.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	42	937	165	37	431	75	72	397	118	60	349	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3252			3235			1593			1630	
Flt Permitted		0.92			0.81			0.88			0.83	
Satd. Flow (perm)		2983			2639			1406			1366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	1018	179	40	468	82	78	432	128	65	379	45
RTOR Reduction (vph)	0	21	0	0	20	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	1222	0	0	570	0	0	624	0	0	483	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1514			1340			541			525	
v/s Ratio Prot												
v/s Ratio Perm		c0.41			0.22			c0.44			0.35	
v/c Ratio		0.81			0.43			1.15			0.92	
Uniform Delay, d1		13.3			10.0			20.0			19.1	
Progression Factor		1.29			1.00			0.88			0.86	
Incremental Delay, d2		3.9			1.0			84.2			17.6	
Delay (s)		21.1			11.0			101.7			34.1	
Level of Service		C			B			F			C	
Approach Delay (s)		21.1			11.0			101.7			34.1	
Approach LOS		C			B			F			C	

Intersection Summary				
HCM Average Control Delay	38.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	112.6%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑			↑	
Volume (vph)	318	1560	264	124	361	90	60	370	95	74	408	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.96	1.00		1.00	1.00		0.98	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.86
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1691	4760		1766	4657		1728	1676	1470	1724	1676	1470
Flt Permitted	0.46	1.00		0.12	1.00		0.33	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	821	4760		232	4657		594	1676	1470	671	1676	1470
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	346	1696	287	135	392	98	65	402	103	80	443	71
RTOR Reduction (vph)	0	36	0	0	50	0	0	0	4	0	0	43
Lane Group Flow (vph)	346	1947	0	135	440	0	65	402	99	80	443	28
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		2
Actuated Green, G (s)	32.0	32.0		32.0	32.0		26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	32.0	32.0		32.0	32.0		26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	404	2343		114	2293		238	670	588	268	670	588
v/s Ratio Prot		0.41			0.09			0.24			c0.26	
v/s Ratio Perm	0.42			c0.58			0.11		0.07	0.12		0.02
v/c Ratio	0.86	0.83		1.18	0.19		0.27	0.60	0.17	0.30	0.66	0.05
Uniform Delay, d1	14.5	14.2		16.5	9.3		13.1	15.4	12.5	13.3	15.9	11.9
Progression Factor	1.00	1.00		1.00	1.00		0.49	0.57	0.43	0.62	0.63	0.38
Incremental Delay, d2	20.2	3.6		142.1	0.2		1.7	2.4	0.4	1.4	2.5	0.1
Delay (s)	34.7	17.8		158.6	9.4		8.1	11.1	5.8	9.6	12.5	4.6
Level of Service	C	B		F	A		A	B	A	A	B	A
Approach Delay (s)		20.3			41.7			9.8			11.2	
Approach LOS		C			D			A			B	

Intersection Summary				
HCM Average Control Delay	20.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	82.7%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	146	307	468	337	25	326	134	58	73	469	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.96	1.00		0.95	1.00		1.00	1.00		0.93	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1702	2724		1675	3308		1770	1564		3181	1525	
Flt Permitted	0.50	1.00		0.42	1.00		0.12	1.00		0.62	1.00	
Satd. Flow (perm)	887	2724		741	3308		233	1564		2077	1525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	159	334	509	366	27	354	146	63	79	510	349
RTOR Reduction (vph)	0	119	0	0	9	0	0	24	0	0	38	0
Lane Group Flow (vph)	370	374	0	509	384	0	354	185	0	79	821	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	341	1048		285	1272		115	770		1023	751	
v/s Ratio Prot		0.14			0.12			0.12			0.54	
v/s Ratio Perm	0.42			c0.69			c1.52			0.04		
v/c Ratio	1.09	0.36		1.79	0.30		3.08	0.24		0.08	1.09	
Uniform Delay, d1	20.0	14.3		20.0	13.9		16.5	9.5		8.7	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.99	0.99	
Incremental Delay, d2	73.4	0.9		367.5	0.6		957.9	0.7		0.1	55.8	
Delay (s)	93.4	15.2		387.5	14.5		974.4	10.2		8.8	72.1	
Level of Service	F	B		F	B		F	B		A	E	
Approach Delay (s)		48.7			225.0			616.4			66.8	
Approach LOS		D			F			F			E	

Intersection Summary				
HCM Average Control Delay	200.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	2.52			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	120.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	10	243	1369	62	180	584	53	83	196	333	154	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	1.00		1.00	0.96			1.00	0.95		0.91
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.97			1.00	0.95		0.85
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3433	3282		1770	3085			3433	1394		1365
Flt Permitted		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		3433	3282		1770	3085			3433	1394		1365
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	264	1488	67	196	635	58	90	213	362	167	20
RTOR Reduction (vph)	0	0	3	0	0	9	0	0	0	0	0	10
Lane Group Flow (vph)	0	275	1552	0	196	774	0	0	213	531	0	8
Confl. Peds. (#/hr)				70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Prot				Prot			Perm
Protected Phases	5	5	2		1	6			7	4		
Permitted Phases												4
Actuated Green, G (s)		12.3	51.0		4.0	41.7			4.0	32.0		32.0
Effective Green, g (s)		12.3	51.0		4.0	41.7			4.0	32.0		32.0
Actuated g/C Ratio		0.11	0.47		0.04	0.38			0.04	0.29		0.29
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		387	1536		65	1180			126	409		401
v/s Ratio Prot		0.08	c0.47		c0.11	0.25			c0.06	c0.38		
v/s Ratio Perm												0.01
v/c Ratio		0.71	1.01		3.02	0.66			1.69	1.30		0.02
Uniform Delay, d1		46.6	29.0		52.5	27.7			52.5	38.5		27.4
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		5.1	25.5		946.6	2.9			342.4	151.2		0.0
Delay (s)		51.7	54.5		999.1	30.6			394.9	189.7		27.4
Level of Service		D	D		F	C			F	F		C
Approach Delay (s)			54.1			224.5				243.3		
Approach LOS			D			F				F		

Intersection Summary				
HCM Average Control Delay	131.9	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.23			
Actuated Cycle Length (s)	109.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	99.7%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	42	19	137	188
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1436
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	21	149	204
RTOR Reduction (vph)	0	0	0	63
Lane Group Flow (vph)	0	67	149	141
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	3	3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	32.0	32.0
Effective Green, g (s)		4.0	32.0	32.0
Actuated g/C Ratio		0.04	0.29	0.29
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		65	547	422
v/s Ratio Prot		0.04	0.08	
v/s Ratio Perm				0.10
v/c Ratio		1.03	0.27	0.33
Uniform Delay, d1		52.5	29.6	30.2
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		120.5	0.1	0.2
Delay (s)		173.0	29.7	30.3
Level of Service		F	C	C
Approach Delay (s)			52.8	
Approach LOS			D	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	383	723	163	269	519	52	0	1426	793	0	630	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3321		3400	3432			5036	1475		4540	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3321		3400	3432			5036	1475		4540	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	416	786	177	292	564	57	0	1535	853	0	685	237
RTOR Reduction (vph)	0	21	0	0	6	0	0	0	386	0	65	0
Lane Group Flow (vph)	416	942	0	292	615	0	0	1535	467	0	857	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Effective Green, g (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.15	0.31		0.26	0.43			0.28	0.28		0.28	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	514	1016		878	1459			1391	408		1254	
v/s Ratio Prot	0.12	c0.28		0.09	c0.18			0.30			0.19	
v/s Ratio Perm									c0.32			
v/c Ratio	0.81	0.93		0.33	0.42			1.10	1.15		0.68	
Uniform Delay, d1	38.7	31.6		28.3	18.9			34.0	34.0		30.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.6	13.7		0.1	0.9			57.7	90.5		1.2	
Delay (s)	47.3	45.3		28.4	19.8			91.8	124.5		31.8	
Level of Service	D	D		C	B			F	F		C	
Approach Delay (s)		45.9			22.6			103.5			31.8	
Approach LOS		D			C			F			C	

Intersection Summary				
HCM Average Control Delay	64.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	112.6%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: Harrison St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations								
Volume (vph)	1009	0	0	957	0	665	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0		4.0		
Lane Util. Factor	0.94			0.91		*0.95		
Frt	1.00			1.00		1.00		
Flt Protected	0.95			1.00		1.00		
Satd. Flow (prot)	4802			4916		3539		
Flt Permitted	0.95			1.00		1.00		
Satd. Flow (perm)	4802			4916		3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1097	0	0	1040	0	723	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1097	0	0	1040	0	723	0	0
Heavy Vehicles (%)	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)				0	0			
Turn Type						custom		
Protected Phases	2			1		1		
Permitted Phases								
Actuated Green, G (s)	33.0			38.0		38.0		
Effective Green, g (s)	33.0			38.0		38.0		
Actuated g/C Ratio	0.41			0.48		0.48		
Clearance Time (s)	5.0			4.0		4.0		
Lane Grp Cap (vph)	1981			2335		1681		
v/s Ratio Prot	c0.23			c0.21		0.20		
v/s Ratio Perm								
v/c Ratio	0.55			0.45		0.43		
Uniform Delay, d1	17.9			14.0		13.9		
Progression Factor	0.78			1.00		0.70		
Incremental Delay, d2	0.4			0.6		0.8		
Delay (s)	14.4			14.6		10.5		
Level of Service	B			B		B		
Approach Delay (s)	14.4			14.6	10.5		0.0	
Approach LOS	B			B	B		A	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	45.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	EBT	EBR	EBR2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	NBR2	SBR
Lane Configurations												
Volume (vph)	297	155	41	136	274	102	270	75	0	712	31	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Util. Factor	0.91	*0.95		0.91	0.91	1.00			0.95	0.95		1.00
Frpb, ped/bikes	1.00	0.88		1.00	1.00	1.00			1.00	0.91		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00			1.00	1.00		1.00
Frt	0.98	1.00		1.00	1.00	0.85			0.94	1.00		0.86
Flt Protected	1.00	1.00		0.95	1.00	1.00			0.97	1.00		1.00
Satd. Flow (prot)	3205	1340		1610	3260	1583			1617	1410		1611
Flt Permitted	1.00	1.00		0.95	0.95	1.00			0.97	1.00		1.00
Satd. Flow (perm)	3205	1340		1610	3113	1583			1617	1410		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	323	168	45	148	298	111	293	82	0	774	34	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	373	163	0	133	313	111	0	0	615	568	0	33
Confl. Peds. (#/hr)			70				70				70	
Confl. Bikes (#/hr)			16								16	
Heavy Vehicles (%)	6%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5								5	
Turn Type		Perm		Prot		Perm	Perm	Split		Perm		custom
Protected Phases	1			2	6			8	8			6
Permitted Phases		1				6	8			8		
Actuated Green, G (s)	18.0	18.0		10.0	20.0	20.0			29.0	29.0		8.0
Effective Green, g (s)	18.0	18.0		10.0	20.0	20.0			29.0	29.0		8.0
Actuated g/C Ratio	0.22	0.22		0.12	0.25	0.25			0.36	0.36		0.10
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0			4.0	4.0		4.0
Lane Grp Cap (vph)	721	302		201	797	396			586	511		161
v/s Ratio Prot	0.12			c0.08	0.05				0.38			0.02
v/s Ratio Perm		c0.12			0.05	0.07				c0.40		
v/c Ratio	0.52	0.54		0.66	0.39	0.28			1.05	1.11		0.20
Uniform Delay, d1	27.2	27.3		33.4	24.9	24.2			25.5	25.5		33.1
Progression Factor	1.00	1.00		1.16	1.18	1.17			1.00	1.00		1.00
Incremental Delay, d2	2.6	6.8		14.5	1.3	1.6			50.8	74.0		2.9
Delay (s)	29.8	34.1		53.1	30.7	29.9			76.3	99.5		35.9
Level of Service	C	C		D	C	C			E	F		D
Approach Delay (s)	31.1				35.9				87.4			
Approach LOS	C				D				F			

Intersection Summary				
HCM Average Control Delay	59.5	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.80			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	74.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	SER2	NWL2	NWL	NWT
Lane Configurations				
Volume (vph)	10	13	96	12
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00
Frt	0.86	1.00	1.00	1.00
Flt Protected	1.00	0.95	0.95	0.96
Satd. Flow (prot)	1611	1770	1649	1678
Flt Permitted	1.00	0.95	0.95	0.96
Satd. Flow (perm)	1611	1770	1649	1678
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	14	104	13
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	11	14	58	59
Confl. Peds. (#/hr)				
Confl. Bikes (#/hr)				16
Heavy Vehicles (%)	2%	2%	4%	2%
Parking (#/hr)				
Turn Type	Free	Split	Split	
Protected Phases		7	7	7
Permitted Phases	Free			
Actuated Green, G (s)	80.0	7.0	7.0	7.0
Effective Green, g (s)	80.0	7.0	7.0	7.0
Actuated g/C Ratio	1.00	0.09	0.09	0.09
Clearance Time (s)		4.0	4.0	4.0
Lane Grp Cap (vph)	1611	155	144	147
v/s Ratio Prot		0.01	c0.04	0.04
v/s Ratio Perm	0.01			
v/c Ratio	0.01	0.09	0.40	0.40
Uniform Delay, d1	0.0	33.6	34.5	34.5
Progression Factor	1.00	0.75	0.77	0.77
Incremental Delay, d2	0.0	1.1	8.1	7.9
Delay (s)	0.0	26.4	34.6	34.4
Level of Service	A	C	C	C
Approach Delay (s)				33.6
Approach LOS				C

Intersection Summary

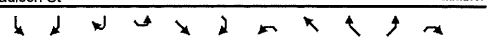
HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	32	14	712	715	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1508			3314	3163	
Flt Permitted	0.96			0.93	1.00	
Satd. Flow (perm)	1506			3100	3163	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	266	35	15	774	753	189
RTOR Reduction (vph)	10	0	0	0	49	0
Lane Group Flow (vph)	291	0	0	789	893	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type				custom		
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	535			1516	1546	
v/s Ratio Prot	c0.19				c0.28	
v/s Ratio Perm				0.25		
v/c Ratio	0.54			0.52	0.58	
Uniform Delay, d1	11.6			7.9	8.2	
Progression Factor	1.00			0.60	1.00	
Incremental Delay, d2	3.9			1.3	1.6	
Delay (s)	15.5			6.0	9.8	
Level of Service	B			A	A	
Approach Delay (s)	15.5			6.0	9.8	
Approach LOS	B			A	A	

Intersection Summary				
HCM Average Control Delay	9.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	52.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & Madison St 5/23/2007

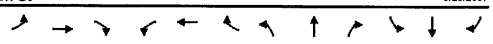


Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	696	15	0	0	0	0	137	723	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		3318						3318	3318		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		3318						3318	3318		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	757	16	0	0	0	0	146	769	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	773	0	0	0	0	0	146	769	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		1253						1585	3060		
v/s Ratio Prot		c0.23						0.04			
v/s Ratio Perm									c0.23		
v/c Ratio		0.62						0.09	0.25		
Uniform Delay, d1		11.4						6.4	0.2		
Progression Factor		1.84						1.02	1.00		
Incremental Delay, d2		1.9						0.1	0.2		
Delay (s)		22.8						6.6	0.4		
Level of Service		C						A	A		
Approach Delay (s)	22.8				0.0			1.4		0.0	
Approach LOS	C				A			A		A	

Intersection Summary				
HCM Average Control Delay	11.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St 5/23/2007



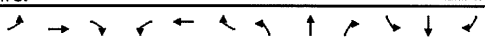
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	66	421	0	0	0	0	0	0	49	806	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.87									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2712									4815	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2712									4815	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	458	0	0	0	0	0	0	53	876	0
RTOR Reduction (vph)	0	85	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	445	0	0	0	0	0	0	0	0	914	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			8									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		874									2568	
v/s Ratio Prot		c0.16										
v/s Ratio Perm											0.19	
v/c Ratio		0.91dr									0.36	
Uniform Delay, d1		12.4									6.0	
Progression Factor		1.00									2.47	
Incremental Delay, d2		2.1									0.3	
Delay (s)		14.5									15.3	
Level of Service		B									B	
Approach Delay (s)		14.5			0.0			0.0			15.3	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	15.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	46.3%	ICU Level of Service	A	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St 5/23/2007

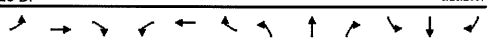


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	640	64	47	459	0	0	0	0	684	505	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.97	
Frt		0.99			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	0.98	
Satd. Flow (prot)		3133			3238					1295	3011	
Flt Permitted		1.00			0.86					0.95	0.98	
Satd. Flow (perm)		3133			2800					1295	3011	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	696	70	51	499	0	0	0	0	743	549	38
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	749	0	0	550	0	0	0	0	438	885	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1462			1307					489	1137	
v/s Ratio Prot		c0.24										
v/s Ratio Perm					0.20					c0.34	0.29	
v/c Ratio		0.51			0.42					0.90	0.78	
Uniform Delay, d1		8.4			8.0					13.2	12.3	
Progression Factor		1.00			1.26					1.50	1.51	
Incremental Delay, d2		1.3			0.9					20.3	4.9	
Delay (s)		9.7			11.0					40.1	23.6	
Level of Service		A			B					D	C	
Approach Delay (s)		9.7			11.0			0.0			29.0	
Approach LOS		A			B			A			C	

Intersection Summary				
HCM Average Control Delay	19.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	67.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	1264	0	0	335	343	129	445	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			3.5				
Lane Util. Factor		0.95			0.95			0.86				
Frpb, ped/bikes		1.00			0.96			1.00				
Flpb, ped/bikes		1.00			1.00			0.98				
Frt		1.00			0.92			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3186			3103			5941				
Flt Permitted		0.84			1.00			0.99				
Satd. Flow (perm)		2686			3103			5941				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	1374	0	0	364	373	140	484	24	0	0	0
RTOR Reduction (vph)	0	0	0	0	72	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1471	0	0	665	0	0	639	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm						Perm					
Protected Phases		1			1			2				
Permitted Phases	1						2					
Actuated Green, G (s)		19.5			19.5			17.0				
Effective Green, g (s)		19.5			19.5			17.0				
Actuated g/C Ratio		0.43			0.43			0.38				
Clearance Time (s)		5.0			5.0			3.5				
Lane Grp Cap (vph)		1164			1345			2244				
v/s Ratio Prot					0.21							
v/s Ratio Perm		c0.55						0.11				
v/c Ratio		1.26			0.49			0.28				
Uniform Delay, d1		12.8			9.2			9.8				
Progression Factor		1.08			1.00			0.47				
Incremental Delay, d2		123.9			1.3			0.3				
Delay (s)		137.7			10.5			4.9				
Level of Service		F			B			A				
Approach Delay (s)		137.7			10.5			4.9			0.0	
Approach LOS		F			B			A			A	

Intersection Summary				
HCM Average Control Delay	74.7	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	86.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	111	0	0	884	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	121	0	0	961	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	390	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	100	100			
cM capacity (veh/h)	586	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3
Volume Total	60	60	320	320	320
Volume Left	60	60	0	0	0
Volume Right	0	0	0	0	0
cSH	586	586	1700	1700	1700
Volume to Capacity	0.10	0.10	0.19	0.19	0.19
Queue Length 95th (ft)	9	9	0	0	0
Control Delay (s)	11.8	11.8	0.0	0.0	0.0
Lane LOS	B	B			
Approach Delay (s)	11.8		0.0		
Approach LOS	B				

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	67.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	46	0	0	935	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	50	0	0	984	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	316	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	641	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	50	246	246	246	246
Volume Left	50	0	0	0	0
Volume Right	0	0	0	0	0
cSH	641	1700	1700	1700	1700
Volume to Capacity	0.08	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	6	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	23.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑									↑↑↑	
Volume (vph)	0	672	177	0	0	0	0	0	0	105	679	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5884									4758	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5884									4758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	730	192	0	0	0	0	0	0	114	738	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	879	0	0	0	0	0	0	0	0	806	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2746									1797	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.17	
v/c Ratio		0.32									0.45	
Uniform Delay, d1		7.5									10.5	
Progression Factor		1.00									1.41	
Incremental Delay, d2		0.3									0.7	
Delay (s)		7.8									15.5	
Level of Service		A									B	
Approach Delay (s)		7.8			0.0			0.0			15.5	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	11.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	36.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑↑				
Volume (vph)	77	666	0	0	0	0	0	534	331	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0				
Lane Util. Factor	1.00	0.91						0.86				
Frpb, ped/bikes	1.00	1.00						0.97				
Flpb, ped/bikes	0.97	1.00						1.00				
Frt	1.00	1.00						0.94				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	1508	4873						5659				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	1508	4873						5659				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	724	0	0	0	0	0	580	360	0	0	0
RTOR Reduction (vph)	46	0	0	0	0	0	0	80	0	0	0	0
Lane Group Flow (vph)	38	724	0	0	0	0	0	860	0	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm											
Protected Phases		2						1				
Permitted Phases	2											
Actuated Green, G (s)	20.5	20.5						18.0				
Effective Green, g (s)	20.5	20.5						18.0				
Actuated g/C Ratio	0.46	0.46						0.40				
Clearance Time (s)	3.5	3.5						3.0				
Lane Grp Cap (vph)	687	2220						2264				
v/s Ratio Prot		c0.15						c0.15				
v/s Ratio Perm	0.03											
v/c Ratio	0.06	0.33						0.38				
Uniform Delay, d1	6.8	7.8						9.6				
Progression Factor	0.82	0.80						2.63				
Incremental Delay, d2	0.1	0.4						0.4				
Delay (s)	5.7	6.6						25.5				
Level of Service	A	A						C				
Approach Delay (s)		6.6			0.0			25.5			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	16.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑						↑↑↑	
Volume (vph)	0	0	0	256	804	0	0	0	0	0	602	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5900						4734	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5900						4734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	278	874	0	0	0	0	0	654	62
RTOR Reduction (vph)	0	0	0	0	59	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1093	0	0	0	0	0	691	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.36	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1786	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.19							
v/c Ratio					0.40						0.39	
Uniform Delay, d1					7.9						10.2	
Progression Factor					0.53						1.70	
Incremental Delay, d2					0.4						0.6	
Delay (s)					4.5						17.9	
Level of Service					A						B	
Approach Delay (s)		0.0			4.5			0.0			17.9	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	9.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	961	25	436	864	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					1.00			1.00				
Flt Protected					1.00			0.98				
Satd. Flow (prot)					5967			5906				
Flt Permitted					1.00			0.98				
Satd. Flow (perm)					5967			5906				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1045	27	469	929	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1064	0	0	1374	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					2519			2297				
v/s Ratio Prot					c0.18							
v/s Ratio Perm								c0.23				
v/c Ratio					0.42			0.60				
Uniform Delay, d1					9.1			11.0				
Progression Factor					1.00			1.57				
Incremental Delay, d2					0.5			1.1				
Delay (s)					9.7			18.3				
Level of Service					A			B				
Approach Delay (s)		0.0			9.7			18.3			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	14.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	46.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St
5/23/2007

Movement	SBL	SBT	SBL	SBT	SBR
Lane Configurations					
Volume (vph)	57	848	46	1447	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.99	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4797	1548	4605	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4797	1548	4605	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	922	50	1573	164
RTOR Reduction (vph)	0	0	0	25	0
Lane Group Flow (vph)	0	984	50	1712	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1842	
v/s Ratio Prot			0.03	c0.37	
v/s Ratio Perm		0.21			
v/c Ratio		0.54	0.08	0.93	
Uniform Delay, d1		11.0	8.4	12.9	
Progression Factor		0.95	1.00	1.00	
Incremental Delay, d2		1.1	0.3	9.8	
Delay (s)		11.5	8.6	22.7	
Level of Service		B	A	C	
Approach Delay (s)		11.5		22.3	
Approach LOS		B		C	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	162	367	0	0	0	0	94	878	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	176	399	0	0	0	0	102	954	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	575	0	0	0	0	0	1107	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.18						0.23	
v/c Ratio					0.51						0.46	
Uniform Delay, d1					11.4						7.0	
Progression Factor					0.97						0.27	
Incremental Delay, d2					1.1						0.5	
Delay (s)					12.1						2.4	
Level of Service					B						A	
Approach Delay (s)		0.0			12.1			0.0			2.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	66	0	0	352	110	192	857	81	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3311			1546			5980				
Flt Permitted		0.94			1.00			0.99				
Satd. Flow (perm)		3132			1546			5980				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	72	0	0	383	120	209	932	88	0	0	0
RTOR Reduction (vph)	0	0	0	0	25	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	74	0	0	478	0	0	1203	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1044			515			2924				
v/s Ratio Prot					c0.31							
v/s Ratio Perm		0.02						0.20				
v/c Ratio		0.07			0.93			0.41				
Uniform Delay, d1		10.2			14.5			7.4				
Progression Factor		1.85			1.00			0.89				
Incremental Delay, d2		0.1			25.2			0.4				
Delay (s)		19.1			39.7			7.0				
Level of Service		B			D			A				
Approach Delay (s)		19.1			39.7			7.0			0.0	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	154	472	0	0	0	0	0	995	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6010						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6010						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	167	513	0	0	0	0	0	1082	128
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	650	0	0	0	0	0	1177	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2270						2204	
v/s Ratio Prot											c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.53	
Uniform Delay, d1					9.8						8.5	
Progression Factor					1.12						0.89	
Incremental Delay, d2					0.3						0.9	
Delay (s)					11.2						8.5	
Level of Service					B						A	
Approach Delay (s)		0.0			11.2			0.0			8.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑↑				
Volume (vph)	0	0	0	0	420	112	194	903	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.98			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5883			6060				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5883			6060				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	457	122	211	982	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	86	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	550	0	0	1107	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2353			2559				
v/s Ratio Prot					c0.09							
v/s Ratio Perm								0.18				
v/c Ratio					0.23			0.43				
Uniform Delay, d1					8.9			9.2				
Progression Factor					1.00			1.98				
Incremental Delay, d2					0.2			0.0				
Delay (s)					9.2			18.3				
Level of Service					A			B				
Approach Delay (s)		0.0			9.2			18.3			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	37.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	1425	481	0	0	0	0	0	0	312	957	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5836									4711	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5836									4711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1549	523	0	0	0	0	0	0	339	1040	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	2054	0	0	0	0	0	0	0	0	1374	0
Confl. Peds. (#/hr)			70								70	
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2594									1884	
v/s Ratio Prot		c0.35										
v/s Ratio Perm											0.29	
v/c Ratio		0.79									0.73	
Uniform Delay, d1		10.7									11.4	
Progression Factor		1.00									1.92	
Incremental Delay, d2		2.6									2.3	
Delay (s)		13.3									24.3	
Level of Service		B									C	
Approach Delay (s)		13.3			0.0				0.0		24.3	
Approach LOS		B			A				A		C	

Intersection Summary				
HCM Average Control Delay	17.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	61.4%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Volume (vph)	204	1347	0	0	0	0	0	900	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.96				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.91				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6085						4239				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6085						4239				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1464	0	0	0	0	0	978	1286	0	0	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	1661	0	0	0	0	0	2262	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2434						1696				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.27										
v/c Ratio		0.68						2.43dr				
Uniform Delay, d1		11.1						13.5				
Progression Factor		1.48						1.00				
Incremental Delay, d2		0.9						154.3				
Delay (s)		17.4						167.8				
Level of Service		B						F				
Approach Delay (s)		17.4			0.0			167.8			0.0	
Approach LOS		B			A			F			A	

Intersection Summary				
HCM Average Control Delay	103.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	77.0%	ICU Level of Service	D	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

Cumulative Conditions Plus Project

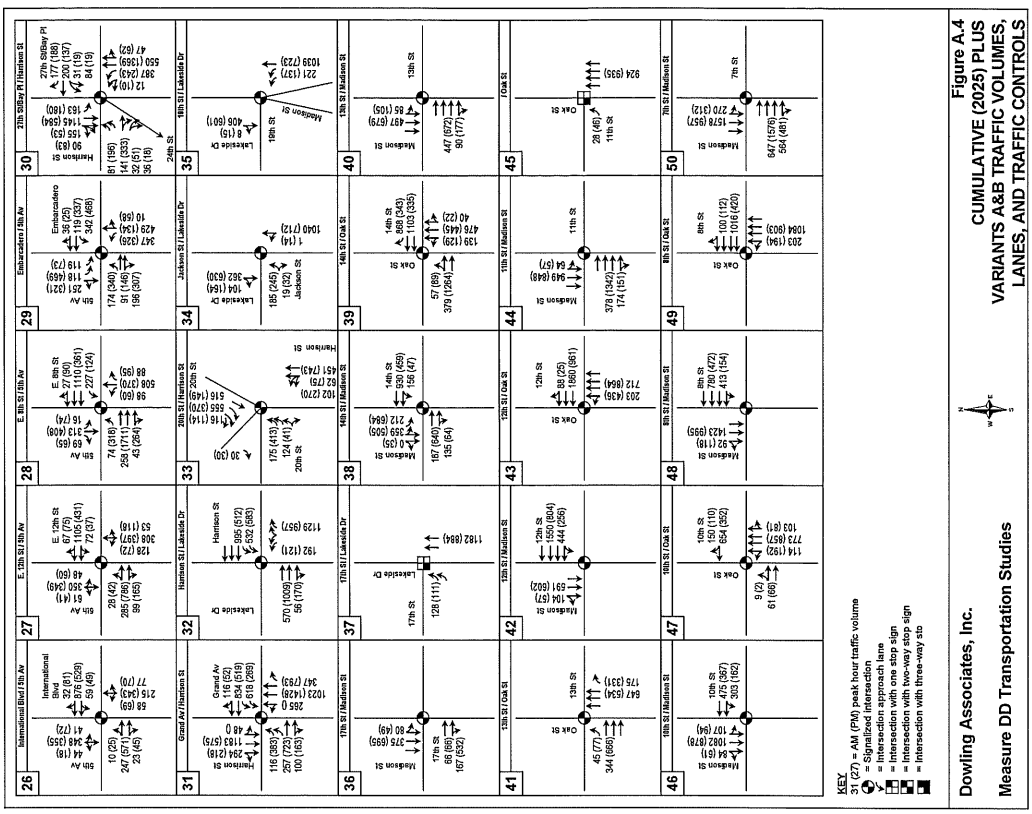


Figure A.4
CUMULATIVE (2025) PLUS
VARIANTS A&B TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

Dowling Associates, Inc.
Measure DD Transportation Studies

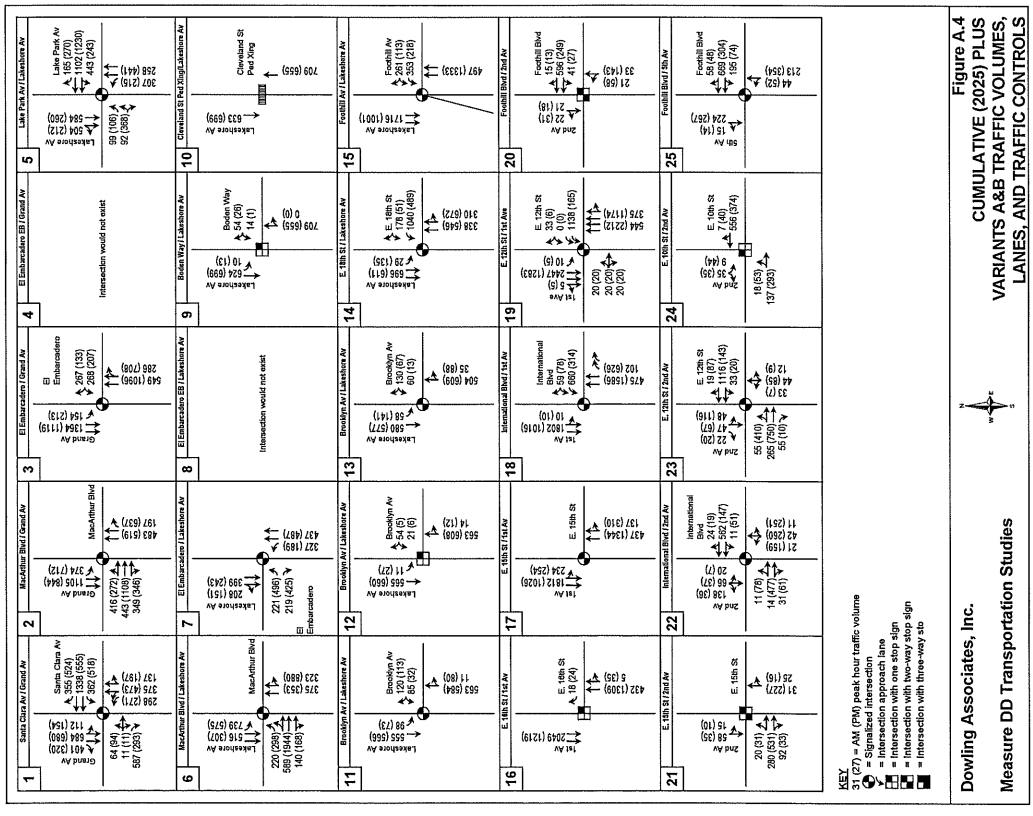
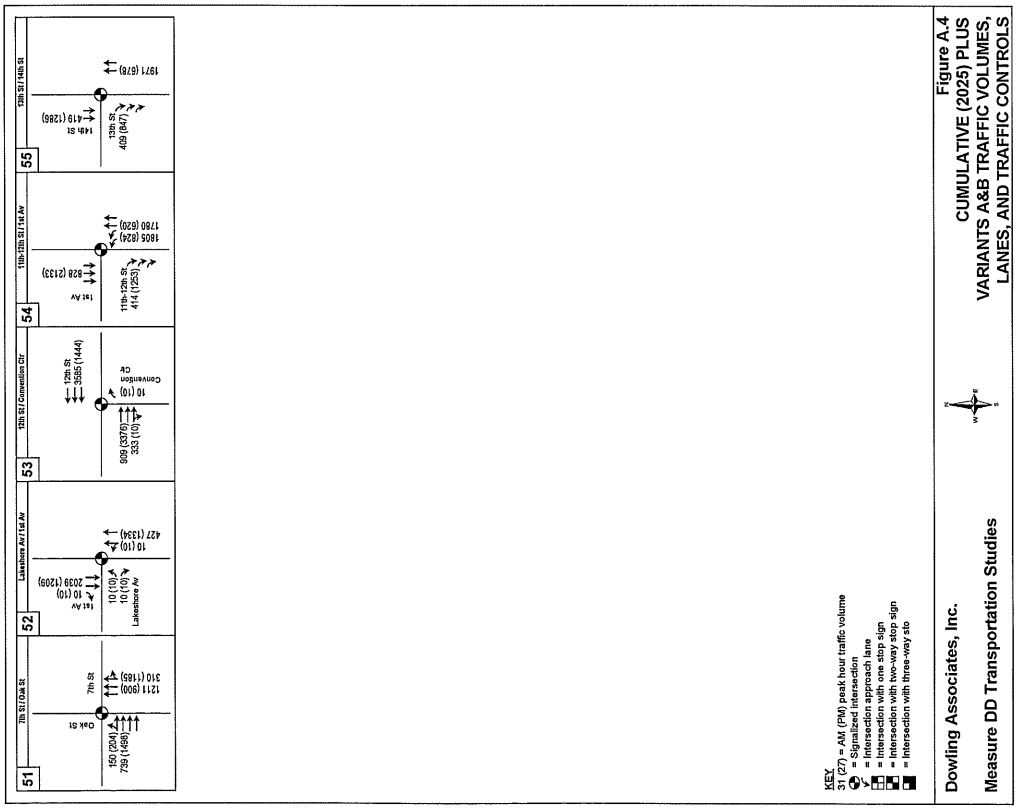


Figure A.4
CUMULATIVE (2025) PLUS
VARIANTS A&B TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

Dowling Associates, Inc.
Measure DD Transportation Studies


7th St/Oak St
Lakeshore Av/ 51st Av
10th St/ Convention Dr
11th-12th St/ 51st Av
53th St/ 14th St
51
52
53
54
55
Oak St
7th St
1st Av
Lakeshore Av
12th St
Convention Dr
11th-12th St
14th St
13th St
150 (204)
729 (1498)
1211 (900)
310 (1165)
10 (10)
10 (10)
10 (10)
2039 (1209)
427 (1334)
969 (3376)
333 (10)
10 (10)
3385 (1444)
414 (1253)
928 (2133)
1805 (824)
1780 (620)
419 (1286)
409 (847)
1971 (678)
KEY
31 (27) = AM (PM) peak hour traffic volume
= Signalized intersection
= Intersection approach lane
= Intersection with one stop sign
= Intersection with two-way stop sign
= Intersection with three-way sto
Dowling Associates, Inc.
Measure DD Transportation Studies
Figure A.4
CUMULATIVE (2025) PLUS
VARIANTS A&B TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	11	567	362	1338	355	298	375	137	112	684	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.98			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1448	1279	1599	3539	1319	1610	2983			3498	1291
Flt Permitted		0.25	1.00	0.59	1.00	1.00	0.95	0.81			0.76	1.00
Satd. Flow (perm)		375	1279	992	3539	1319	1610	2414			2661	1291
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	70	12	616	385	1423	378	314	395	144	122	743	436
RTOR Reduction (vph)	0	46	177	0	0	68	0	29	0	0	0	13
Lane Group Flow (vph)	0	149	346	385	1423	310	283	541	0	0	865	423
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		172	585	454	1619	604	190	1172			803	390
v/s Ratio Prot					c0.40		c0.18	0.05				
v/s Ratio Perm		0.40	0.27	0.39		0.23		0.16			0.33	c0.33
v/c Ratio		0.87	0.59	0.85	0.88	0.51	1.49	0.46			1.08	1.09
Uniform Delay, d1		25.9	21.4	25.5	26.1	20.4	46.8	19.8			37.0	37.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.76	1.43			1.00	1.00
Incremental Delay, d2		40.8	4.4	17.6	7.1	3.1	239.9	1.0			54.6	70.5
Delay (s)		66.6	25.7	43.1	33.2	23.5	275.6	29.3			91.6	107.5
Level of Service		E	C	D	C	C	F	C			F	F
Approach Delay (s)		36.9			33.3			111.0			97.0	
Approach LOS		D			C			F			F	

Intersection Summary				
HCM Average Control Delay	63.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.03			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	115.8%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	443	349	0	0	0	0	463	197	374	1105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.97						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4346						3539	1329	1770	3318	
Flt Permitted		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4346						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	457	360	0	0	0	0	525	214	407	1201	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1203	0	0	0	0	0	525	214	407	1201	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1497						968	1329	459	1894	
v/s Ratio Prot								0.15		c0.23		
v/s Ratio Perm		0.28							0.16		c0.36	
v/c Ratio		0.80						0.54	0.16	0.89	0.63	
Uniform Delay, d1		31.5						32.8	0.0	37.8	15.3	
Progression Factor		1.00						1.00	1.00	1.08	0.72	
Incremental Delay, d2		4.7						2.2	0.3	10.5	0.7	
Delay (s)		36.2						35.0	0.3	51.4	11.7	
Level of Service		D						D	A	D	B	
Approach Delay (s)		36.2			0.0			25.0			21.8	
Approach LOS		D			A			C			C	

Intersection Summary				
HCM Average Control Delay	27.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	72.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
3: El Embarcadero WB & Grand Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	266	267	549	286	154	1364
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0		4.0	5.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.99		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.93		0.95		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1670		3357		1770	3318
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1670		3357		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	291	290	597	311	167	1483
RTOR Reduction (vph)	61	0	110	0	0	0
Lane Group Flow (vph)	520	0	798	0	167	1483
Confl. Peds. (#/hr)	70	7				
Confl. Bikes (#/hr)		16				
Parking (#/hr)						5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	19.6		19.6		7.6	31.4
Effective Green, g (s)	19.6		19.6		7.6	31.4
Actuated g/C Ratio	0.33		0.33		0.13	0.52
Clearance Time (s)	4.0		5.0		4.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	546		1108		224	1736
v/s Ratio Prot	c0.31		0.24		0.09	c0.45
v/s Ratio Perm						
v/c Ratio	0.95		0.72		0.75	0.85
Uniform Delay, d1	19.8		17.7		25.3	12.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	26.8		4.1		11.2	5.6
Delay (s)	46.6		21.7		36.4	17.9
Level of Service	D		C		D	B
Approach Delay (s)	46.6		21.7			19.8
Approach LOS	D		C			B

Intersection Summary				
HCM Average Control Delay	25.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.89			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	76.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	92	443	1102	165	307	258	0	0	584	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.84			1.00	0.97	1.00	1.00			0.93	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1125			3489	1336	1770	3539			2872	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1125			3489	1336	1770	3539			2872	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	100	461	1148	172	334	280	0	0	621	536
RTOR Reduction (vph)	0	96	0	0	0	64	0	0	0	0	75	0
Lane Group Flow (vph)	97	15	0	0	1609	108	334	280	0	0	1082	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Effective Green, g (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Actuated g/C Ratio	0.04	0.04			0.31	0.31	0.16	0.51			0.29	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	63	42			1090	418	288	1792			844	
v/s Ratio Prot	c0.06	0.01			c0.46		c0.19	0.08			c0.38	
v/s Ratio Perm						0.08						
v/c Ratio	1.54	0.35			1.48	0.26	1.16	0.16			1.28	
Uniform Delay, d1	38.5	37.6			27.5	20.6	33.5	10.6			28.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	307.3	1.8			219.3	1.5	103.4	0.0			136.0	
Delay (s)	345.8	39.4			246.8	22.1	136.9	10.6			164.3	
Level of Service	F	D			F	C	F	B			F	
Approach Delay (s)		182.3			225.1			79.3			164.3	
Approach LOS		F			F			E			F	

Intersection Summary				
HCM Average Control Delay	180.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.34			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	113.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	569	140	0	0	0	0	375	323	739	516	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.93		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1516	4605						3012		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.14	1.00	
Satd. Flow (perm)	1516	4605						3012		267	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	640	152	0	0	0	0	408	351	803	561	0
RTOR Reduction (vph)	0	31	0	0	0	0	0	30	0	0	0	0
Lane Group Flow (vph)	215	785	0	0	0	0	0	729	0	803	561	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm									prm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1347						881		613	2204	
v/s Ratio Prot								0.24		c0.39	0.16	
v/s Ratio Perm	0.14	0.17								c0.43		
v/c Ratio	0.49	0.58						0.83		1.31	0.25	
Uniform Delay, d1	30.9	32.0						35.0		28.4	9.0	
Progression Factor	1.01	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.6	1.3						8.8		150.9	0.3	
Delay (s)	33.8	33.2						43.8		179.3	9.2	
Level of Service	C	C						D		F	A	
Approach Delay (s)		33.3			0.0			43.8			109.4	
Approach LOS		C			A			D			F	

Intersection Summary				
HCM Average Control Delay	68.7	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	95.1%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
7: El Embarcadero WB & Lakeshore Av — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	221	219	327	437	399	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1527	1770	3539	2960	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1527	1770	3539	2960	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	240	238	355	475	434	226
RTOR Reduction (vph)	0	181	0	0	92	0
Lane Group Flow (vph)	240	57	355	475	568	0
Confl. Peds. (#/hr)	15	12	65			65
Confl. Bikes (#/hr)		18				9
Parking (#/hr)					5	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.0	13.0	14.9	33.1	14.2	
Effective Green, g (s)	13.0	13.0	14.9	33.1	14.2	
Actuated g/C Ratio	0.24	0.24	0.28	0.61	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	425	367	487	2165	777	
v/s Ratio Prot	c0.14		c0.20	0.13	c0.19	
v/s Ratio Perm		0.04				
v/c Ratio	0.56	0.16	0.73	0.22	0.73	
Uniform Delay, d1	18.1	16.2	17.8	4.7	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.1	4.6	0.0	3.1	
Delay (s)	19.1	16.3	22.4	4.7	21.3	
Level of Service	B	B	C	A	C	
Approach Delay (s)	17.7			12.3	21.3	
Approach LOS	B			B	C	

Intersection Summary				
HCM Average Control Delay	16.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	62.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
10: Cleveland St & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	709	0	0	633
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	0	746	0	0	688
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	746	0	0	688
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.46			0.42
v/s Ratio Perm						
v/c Ratio			0.54			0.50
Uniform Delay, d1			2.7			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.2			0.1
Delay (s)			2.9			2.6
Level of Service			A			A
Approach Delay (s)	0.0		2.9			2.6
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.8	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	40.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
11: Brooklyn Av & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	85	120	563	11	98	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.90		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.92		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1324		1620		1770	1863
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1324		1620		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	130	612	12	107	603
RTOR Reduction (vph)	91	0	1	0	0	0
Lane Group Flow (vph)	131	0	623	0	107	603
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	6.9		23.1		4.2	31.3
Effective Green, g (s)	6.9		23.1		4.2	31.3
Actuated g/C Ratio	0.16		0.52		0.10	0.71
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	207		847		168	1319
v/s Ratio Prot	c0.10		c0.38		c0.06	0.32
v/s Ratio Perm						
v/c Ratio	0.63		0.74		0.64	0.46
Uniform Delay, d1	17.5		8.2		19.3	2.8
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	4.6		2.9		5.7	0.1
Delay (s)	22.0		11.1		25.0	2.9
Level of Service	C		B		C	A
Approach Delay (s)	22.0		11.1			6.2
Approach LOS	C		B			A

Intersection Summary				
HCM Average Control Delay	10.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	60.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Measure DD
9: Boden Way & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	54	709	0	10	624
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	15	59	746	0	11	678
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	74	746	11	678
Volume Left	15	0	11	0
Volume Right	59	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	48.5%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
12: Wesley Ave & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	54	563	14	11	565
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	23	59	612	15	12	595
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.91	0.87			0.87	
vC, conflicting volume	1265	637			643	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1014	503			510	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	88			99	
cM capacity (veh/h)	233	485			901	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	82	627	12	595
Volume Left	23	0	12	0
Volume Right	59	15	0	0
cSH	372	1700	901	1700
Volume to Capacity	0.22	0.37	0.01	0.35
Queue Length 95th (ft)	21	0	1	0
Control Delay (s)	17.4	0.0	9.0	0.0
Lane LOS	C		A	
Approach Delay (s)	17.4	0.0	0.2	
Approach LOS	C			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
16: E 16th St & 1st Ave #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	432	5	0	2049
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	470	5	0	2227
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.65	0.99			0.99	
vC, conflicting volume	1656	378			545	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841	339			509	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	186	574			976	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	313	162	1114	1114
Volume Left	0	0	0	0	0
Volume Right	20	0	5	0	0
cSH	574	1700	1700	1700	1700
Volume to Capacity	0.03	0.18	0.10	0.66	0.66
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	75.7%	ICU Level of Service		D
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
20: Foothill Blvd #2 & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	41	596	15	21	33	0	0	21	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	45	648	16	23	36	0	0	23	24
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	867			26			499	782	26	766	774	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	867			26			499	782	26	766	774	360
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			94	88	100	100	93	96
cM capacity (veh/h)	916			1552			388	307	1021	255	311	635

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	368	340	59	47
Volume Left	45	0	23	0
Volume Right	0	16	0	24
cSH	1552	1700	334	421
Volume to Capacity	0.03	0.20	0.18	0.11
Queue Length 95th (ft)	2	0	16	9
Control Delay (s)	1.1	0.0	18.0	14.6
Lane LOS	A		C	B
Approach Delay (s)	0.6		18.0	14.6
Approach LOS			C	B

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	34.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Measure DD
13: Hanover Ave & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	130	504	35	58	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.95		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1384		1609		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1384		1609		1770	1630
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	65	141	548	38	60	604
RTOR Reduction (vph)	94	0	4	0	0	0
Lane Group Flow (vph)	112	0	582	0	60	604
Confl. Peds. (#/hr)	70	31		17	17	
Confl. Bikes (#/hr)		7		15		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		24.0		5.0	33.0
Effective Green, g (s)	20.0		24.0		5.0	33.0
Actuated g/C Ratio	0.33		0.40		0.08	0.55
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	461		644		148	897
v/s Ratio Prot	c0.08		c0.36		0.03	c0.37
v/s Ratio Perm						
v/c Ratio	0.24		0.90		0.41	0.67
Uniform Delay, d1	14.5		16.9		26.1	9.6
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.2		18.4		8.1	4.0
Delay (s)	15.8		35.3		34.1	13.7
Level of Service	B		D		C	B
Approach Delay (s)	15.8		35.3			15.5
Approach LOS	B		D			B

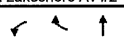
Intersection Summary				
HCM Average Control Delay	23.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	59.6%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
14: E. 18th St & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	1040	178	338	310	29	696
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.97		0.96		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.98		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3276		2951		1770	3362
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3276		2951		1770	3362
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1118	191	367	337	32	757
RTOR Reduction (vph)	16	0	147	0	0	0
Lane Group Flow (vph)	1293	0	557	0	32	757
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			0
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	46.6		40.8		3.6	47.4
Effective Green, g (s)	46.6		40.8		3.6	47.4
Actuated g/C Ratio	0.47		0.41		0.04	0.47
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	1527		1204		64	1594
v/s Ratio Prot	c0.39		0.19		0.02	
v/s Ratio Perm						c0.23
v/c Ratio	0.85		0.46		0.50	0.47
Uniform Delay, d1	23.6		21.6		47.3	17.9
Progression Factor	1.00		0.80		1.00	1.00
Incremental Delay, d2	4.4		1.2		2.2	1.0
Delay (s)	27.9		18.4		49.5	18.9
Level of Service	C		B		D	B
Approach Delay (s)	27.9		18.4			20.1
Approach LOS	C		B			C

Intersection Summary				
HCM Average Control Delay	23.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	66.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

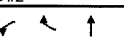
HCM Signalized Intersection Capacity Analysis — Measure DD
15: Foothill Blvd #2 & Lakeshore Av #2 — 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	353	261	497	0	0	1716
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.94		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.94		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3056		3406			3406
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3056		3406			3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	284	540	0	0	1865
RTOR Reduction (vph)	144	0	0	0	0	0
Lane Group Flow (vph)	524	0	540	0	0	1865
Confl. Peds. (#/hr)		43				
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	20.7		72.8			72.8
Effective Green, g (s)	20.7		72.8			72.8
Actuated g/C Ratio	0.21		0.73			0.73
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	633		2480			2480
v/s Ratio Prot	c0.17		0.16			c0.55
v/s Ratio Perm						
v/c Ratio	0.83		0.22			0.75
Uniform Delay, d1	38.0		4.4			8.2
Progression Factor	1.00		1.14			1.22
Incremental Delay, d2	8.4		0.2			1.6
Delay (s)	46.3		5.2			11.6
Level of Service	D		A			B
Approach Delay (s)	46.3		5.2			11.6
Approach LOS	D		A			B

Intersection Summary				
HCM Average Control Delay	18.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
17: E 15th St & 1st Ave #2 — 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	437	137	234	1812
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.96			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3253			3401
Flt Permitted			1.00			0.76
Satd. Flow (perm)			3253			2594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	475	149	254	1970
RTOR Reduction (vph)	0	0	12	0	0	0
Lane Group Flow (vph)	0	0	612	0	0	2224
Confl. Peds. (#/hr)				17		
Confl. Bikes (#/hr)				4		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type					pm+pt	
Protected Phases			2		1 4	6
Permitted Phases					6	
Actuated Green, G (s)			86.4			92.0
Effective Green, g (s)			86.4			92.0
Actuated g/C Ratio			0.86			0.92
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2811			2432
v/s Ratio Prot			0.19			c0.05
v/s Ratio Perm						c0.79
v/c Ratio			0.22			0.91
Uniform Delay, d1			1.1			2.0
Progression Factor			1.88			4.36
Incremental Delay, d2			0.2			4.0
Delay (s)			2.3			12.8
Level of Service			A			B
Approach Delay (s)	0.0		2.3			12.8
Approach LOS	A		A			B

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
18: International Blvd & 1st Ave #1#2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	660	59	475	102	10	1802
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.99		1.00	0.96		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3314		3406	2614		3405
Flt Permitted	0.96		1.00	1.00		0.95
Satd. Flow (perm)	3314		3406	2614		3242
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	717	64	516	111	11	1959
RTOR Reduction (vph)	7	0	0	37	0	0
Lane Group Flow (vph)	774	0	516	74	0	1970
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	25.7		66.3	66.3		66.3
Effective Green, g (s)	25.7		66.3	66.3		66.3
Actuated g/C Ratio	0.25		0.66	0.66		0.66
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	852		2258	1733		2149
v/s Ratio Prot	c0.23		0.15			
v/s Ratio Perm				0.03		c0.61
v/c Ratio	0.91		0.23	0.04		0.92
Uniform Delay, d1	36.0		6.7	5.8		14.5
Progression Factor	1.00		0.33	0.00		0.87
Incremental Delay, d2	13.1		0.2	0.0		3.7
Delay (s)	49.1		2.4	0.1		16.4
Level of Service	D		A	A		B
Approach Delay (s)	49.1		2.0			16.4
Approach LOS	D		A			B

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
19: Driveway & 1st Ave #1#2 — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	1138	0	33	0	544	375	10	2447	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.93		1.00	0.99			0.94		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		0.97	1.00	
Frt		0.96		1.00	0.99			0.94		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1630		3221	1387			5373		1718	4890	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1630		3221	1387			5373		1718	4890	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	1237	0	36	0	591	408	11	2660	5
RTOR Reduction (vph)	0	1	0	0	4	0	0	106	0	0	0	0
Lane Group Flow (vph)	0	65	0	854	415	0	0	893	0	11	2665	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split							Prot	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		7.6		25.0	25.0			50.6		0.8	55.4	
Effective Green, g (s)		7.6		25.0	25.0			50.6		0.8	55.4	
Actuated g/C Ratio		0.08		0.25	0.25			0.51		0.01	0.55	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		124		805	347			2719		14	2709	
v/s Ratio Prot		c0.04		0.27	c0.30			0.17		0.01	c0.54	
v/s Ratio Perm												
v/c Ratio		0.52		1.06	1.20			0.33		0.79	0.98	
Uniform Delay, d1		44.5		37.5	37.5			14.6		49.5	21.9	
Progression Factor		1.00		1.00	1.00			0.14		1.09	0.84	
Incremental Delay, d2		1.8		49.1	113.2			0.3		68.0	7.9	
Delay (s)		46.3		86.6	150.7			2.3		121.9	26.2	
Level of Service		D		F	F			A		F	C	
Approach Delay (s)		46.3			107.7			2.3			26.6	
Approach LOS		D			F			A			C	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
22: International Blvd & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	14	31	11	562	24	21	42	11	20	66	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.99			0.99	
Frt		0.92			0.99			0.98			0.92	
Flt Protected		0.99			1.00			0.99			0.98	
Satd. Flow (prot)		2827			3220			1534			1400	
Flt Permitted		0.87			0.95			0.92			0.98	
Satd. Flow (perm)		2485			3067			1424			1378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	15	34	12	611	26	23	46	12	22	72	150
RTOR Reduction (vph)	0	24	0	0	8	0	0	5	0	0	49	0
Lane Group Flow (vph)	0	37	0	0	641	0	0	76	0	0	195	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		19.5			19.5			39.5			39.5	
Effective Green, g (s)		19.5			19.5			39.5			39.5	
Actuated g/C Ratio		0.30			0.30			0.61			0.61	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		746			920			865			837	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.21			0.05			c0.14	
v/c Ratio		0.05			0.70			0.09			0.23	
Uniform Delay, d1		16.2			20.1			5.3			5.8	
Progression Factor		1.00			0.38			1.00			1.00	
Incremental Delay, d2		0.0			1.2			0.2			0.7	
Delay (s)		16.2			8.9			5.5			6.5	
Level of Service		B			A			A			A	
Approach Delay (s)		16.2			8.9			5.5			6.5	
Approach LOS		B			A			A			A	

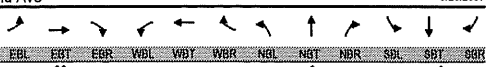
Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
23: E. 12TH & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	265	55	33	1116	19	33	44	12	48	47	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		0.96			1.00			0.98			1.00	0.86
Flpb, ped/bikes		1.00			1.00			0.96			0.95	1.00
Frt		0.98			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.98	1.00
Satd. Flow (prot)		3104			3499			1483			1725	1363
Flt Permitted		0.70			0.93			0.87			0.81	1.00
Satd. Flow (perm)		2197			3269			1307			1436	1363
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	288	60	36	1213	21	36	48	13	52	51	24
RTOR Reduction (vph)	0	16	0	0	1	0	0	6	0	0	0	18
Lane Group Flow (vph)	0	392	0	0	1269	0	0	91	0	0	103	6
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5				5		5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		57.5			57.5			23.0			23.0	23.0
Effective Green, g (s)		57.5			57.5			23.0			23.0	23.0
Actuated g/C Ratio		0.64			0.64			0.26			0.26	0.26
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1404			2089			334			367	348
v/s Ratio Prot												
v/s Ratio Perm		0.18			c0.39			0.07			c0.07	0.00
v/c Ratio		0.28			0.61			0.27			0.28	0.02
Uniform Delay, d1		7.1			9.6			26.8			26.9	25.1
Progression Factor		1.00			1.00			1.03			1.00	1.00
Incremental Delay, d2		0.5			1.3			2.0			1.9	0.1
Delay (s)		7.6			10.9			29.6			28.8	25.1
Level of Service		A			B			C			C	C
Approach Delay (s)		7.6			10.9			29.6			28.1	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
21: E 15th St #1 & 2nd Ave — 5/23/2007

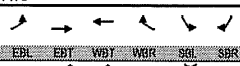


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	280	92	0	0	0	0	31	25	15	58	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	304	100	0	0	0	0	34	27	16	63	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	17			431			466	442	259	287	492	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			302			328	313	121	150	365	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	94	97	98	88	100
cM capacity (veh/h)	1576			1169			488	544	845	669	508	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	174	252	61	79
Volume Left	22	0	0	16
Volume Right	0	100	27	0
cSH	1576	1700	647	534
Volume to Capacity	0.01	0.15	0.09	0.15
Queue Length 95th (ft)	1	0	8	13
Control Delay (s)	1.0	0.0	11.1	12.9
Lane LOS	A		B	B
Approach Delay (s)	0.4		11.1	12.9
Approach LOS			B	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
24: E. 10th St & 2nd Ave — 5/23/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	18	137	656	7	9	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	149	604	8	10	38
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	682				936	748
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	682				936	748
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	90
cM capacity (veh/h)	858				255	366

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	169	612	48
Volume Left	20	0	10
Volume Right	0	8	38
cSH	858	1700	336
Volume to Capacity	0.02	0.36	0.14
Queue Length 95th (ft)	2	0	12
Control Delay (s)	1.3	0.0	17.5
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	17.5
Approach LOS			C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

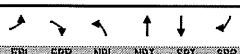
HCM Unsignalized Intersection Capacity Analysis — Measure DD
37: 17th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	128	0	0	1182	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	0	0	1285	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked	0.96					
vC, conflicting volume	712	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	100	100			
cM capacity (veh/h)	406	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	70	70	642	642
Volume Left	70	70	0	0
Volume Right	0	0	0	0
cSH	406	406	1700	1700
Volume to Capacity	0.17	0.17	0.38	0.38
Queue Length 95th (ft)	15	15	0	0
Control Delay (s)	15.7	15.7	0.0	0.0
Lane LOS	C	C		
Approach Delay (s)	15.7		0.0	
Approach LOS	C			

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	75.5%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
45: 11th St & Oak St — 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	28	0	0	924	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	0	1004	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	321	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	637	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	30	251	251	251	251
Volume Left	30	0	0	0	0
Volume Right	0	0	0	0	0
cSH	637	1700	1700	1700	1700
Volume to Capacity	0.05	0.15	0.15	0.15	0.15
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	23.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Measure DD
25: Foothill Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	195	669	58	44	213	0	0	224	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.98			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3213			1647			1652	
Flt Permitted					0.99			0.92			1.00	
Satd. Flow (perm)					3213			1529			1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	212	727	63	48	232	0	0	243	16
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	994	0	0	280	0	0	255	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1335			741			801	
v/s Ratio Prot											0.15	
v/s Ratio Perm					0.31			c0.18				
v/c Ratio					0.74			0.38			0.32	
Uniform Delay, d1					16.1			10.6			10.2	
Progression Factor					1.00			1.28			1.00	
Incremental Delay, d2					3.8			1.2			1.0	
Delay (s)					19.9			14.7			11.3	
Level of Service					B			B			B	
Approach Delay (s)		0.0			19.9			14.7			11.3	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	17.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	63.7%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
26: International Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	247	23	59	876	32	56	215	77	41	348	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3284			3313			1584			1630	
Flt Permitted		0.92			0.91			0.88			0.94	
Satd. Flow (perm)		3032			3038			1407			1536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	268	25	64	952	35	83	234	84	45	378	48
RTOR Reduction (vph)	0	10	0	0	4	0	0	16	0	0	6	0
Lane Group Flow (vph)	0	294	0	0	1047	0	0	365	0	0	465	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1376			1379			606			662	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.34			0.26			c0.30	
v/c Ratio		0.21			0.76			0.60			0.70	
Uniform Delay, d1		10.7			14.8			14.2			15.1	
Progression Factor		1.01			1.00			1.03			0.66	
Incremental Delay, d2		0.4			4.0			0.4			5.4	
Delay (s)		11.2			18.8			15.0			15.4	
Level of Service		B			B			B			B	
Approach Delay (s)		11.2			18.8			15.0			15.4	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	16.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
27: E 12th Street & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	265	99	72	1105	67	128	308	53	48	350	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.96			0.99			0.99			0.96	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3162			3304			1609			1619	
Flt Permitted		0.82			0.90			0.68			0.92	
Satd. Flow (perm)		2616			2972			1114			1489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	310	108	78	1201	73	139	335	58	52	380	66
RTOR Reduction (vph)	0	47	0	0	6	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	401	0	0	1346	0	0	525	0	0	489	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1328			1509			428			573	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.45			c0.47			0.33	
v/c Ratio		0.30			0.89			1.23			0.85	
Uniform Delay, d1		9.3			14.4			20.0			18.3	
Progression Factor		1.00			1.00			1.00			0.66	
Incremental Delay, d2		0.6			8.4			115.3			11.8	
Delay (s)		9.9			22.8			135.2			24.3	
Level of Service		A			C			F			C	
Approach Delay (s)		9.9			22.8			135.2			24.3	
Approach LOS		A			C			F			C	

Intersection Summary				
HCM Average Control Delay	42.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	125.2%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
28: E. 8th St & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	258	43	227	1110	27	98	508	66	16	313	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.99	1.00		0.97	1.00		0.97	1.00	1.00	0.98	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	4761		1711	4885		1718	1676	1471	1737	1676	1471
Flt Permitted	0.16	1.00		0.55	1.00		0.45	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	289	4761		984	4885		814	1676	1471	439	1676	1471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	280	47	247	1207	29	107	552	96	17	340	75
RTOR Reduction (vph)	0	25	0	0	4	0	0	0	55	0	0	13
Lane Group Flow (vph)	80	302	0	247	1232	0	107	552	41	17	340	62
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		2
Actuated Green, G (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	136	2234		462	2292		344	709	622	186	709	622
v/s Ratio Prot		0.06			0.25			c0.33			0.20	
v/s Ratio Perm	c0.28			0.25			0.13		0.03	0.04		0.04
v/c Ratio	0.59	0.14		0.53	0.54		0.31	0.78	0.07	0.09	0.48	0.10
Uniform Delay, d1	12.6	9.8		12.2	12.2		12.5	16.1	11.1	11.3	13.6	11.3
Progression Factor	1.00	1.00		1.00	1.00		1.47	1.49	2.60	0.55	0.63	0.44
Incremental Delay, d2	17.3	0.1		4.4	0.9		2.1	7.4	0.2	0.6	1.5	0.2
Delay (s)	29.9	9.9		16.6	13.2		20.4	31.4	29.1	6.8	10.0	5.2
Level of Service	C	A		B	B		C	C	C	A	A	A
Approach Delay (s)		13.8			13.7			29.6			9.0	
Approach LOS		B			B			C			A	

Intersection Summary				
HCM Average Control Delay	17.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	77.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
29: Embarcadero & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	91	196	342	119	36	347	429	10	119	118	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	0.98		1.00	1.00		1.00	0.95	
Flpb, ped/bikes	0.95	1.00		0.93	1.00		0.97	1.00		0.96	1.00	
Frt	1.00	0.90		1.00	0.97		1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1674	2720		1639	3180		1717	1668		3289	1426	
Flt Permitted	0.65	1.00		0.56	1.00		0.43	1.00		0.36	1.00	
Satd. Flow (perm)	1138	2720		970	3180		774	1668		1246	1426	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	99	213	372	129	39	377	466	11	129	128	273
RTOR Reduction (vph)	0	128	0	0	23	0	0	1	0	0	118	0
Lane Group Flow (vph)	189	184	0	372	145	0	377	476	0	129	283	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.0	26.0		26.0	26.0		31.0	31.0		31.0	31.0	
Effective Green, g (s)	26.0	26.0		26.0	26.0		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.48	0.48		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	455	1088		388	1272		369	796		594	680	
v/s Ratio Prot		0.07			0.05			0.29			0.20	
v/s Ratio Perm	0.17			c0.38			c0.49			0.10		
v/c Ratio	0.42	0.17		0.96	0.11		1.02	0.60		0.22	0.42	
Uniform Delay, d1	14.0	12.5		19.0	12.3		17.0	12.4		9.9	11.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.30	1.91	
Incremental Delay, d2	2.8	0.3		36.4	0.2		52.5	3.3		0.7	1.7	
Delay (s)	16.8	12.9		55.4	12.4		69.5	15.7		13.7	22.8	
Level of Service	B	B		E	B		E	B		B	C	
Approach Delay (s)		14.4			42.0			39.5			20.6	
Approach LOS		B			D			D			C	

Intersection Summary				
HCM Average Control Delay	30.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	12	387	550	47	163	1145	155	90	81	141	32	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	1.00		1.00	0.96			1.00	0.97		0.91
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.97			1.00	0.97		0.85
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3433	3279		1770	3112			3433	1449		1364
Flt Permitted		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		3433	3279		1770	3112			3433	1449		1364
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	421	598	51	177	1245	168	98	88	153	35	39
RTOR Reduction (vph)	0	0	5	0	0	4	0	0	0	1	0	29
Lane Group Flow (vph)	0	434	644	0	177	1507	0	0	88	191	0	6
Confl. Peds. (#/hr)					70		70	70	70		70	70
Confl. Bikes (#/hr)							16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Prot				Prot			Perm
Protected Phases	5	5	2		1	6			7	4		
Permitted Phases												4
Actuated Green, G (s)		7.0	54.3		5.0	51.3			4.0	18.3		18.3
Effective Green, g (s)		7.0	54.3		5.0	51.3			4.0	18.3		18.3
Actuated g/C Ratio		0.07	0.55		0.05	0.52			0.04	0.18		0.18
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		241	1788		89	1603			138	266		251
v/s Ratio Prot		c0.13	c0.20		0.10	c0.48			0.03	c0.13		
v/s Ratio Perm												0.00
v/c Ratio		1.80	0.36		1.99	0.94			0.64	0.72		0.03
Uniform Delay, d1		46.3	12.8		47.3	22.7			47.1	38.2		33.3
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		376.5	0.6		482.5	12.2			6.9	7.5		0.0
Delay (s)		422.8	13.4		529.8	34.9			54.0	45.7		33.4
Level of Service		F	B		F	C			D	D		C
Approach Delay (s)			177.4			86.8				46.7		
Approach LOS			F			F				D		

Intersection Summary				
HCM Average Control Delay	117.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	24.0	
Intersection Capacity Utilization	99.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	64	31	200	177
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1436
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	34	217	192
RTOR Reduction (vph)	0	0	0	157
Lane Group Flow (vph)	0	125	217	35
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	3	3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	18.3	18.3
Effective Green, g (s)		4.0	18.3	18.3
Actuated g/C Ratio		0.04	0.18	0.18
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		71	342	264
v/s Ratio Prot		c0.07	0.12	
v/s Ratio Perm				0.02
v/c Ratio		1.76	0.63	0.13
Uniform Delay, d1		47.8	37.6	34.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		393.3	2.8	0.1
Delay (s)		441.1	40.4	34.1
Level of Service		F	D	C
Approach Delay (s)			131.9	
Approach LOS			F	

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Measure DD
31: Grand Av & Harrison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	257	100	618	834	116	265	1023	347	48	1183	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3246		3400	3384			4989	1456		4694	
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.77	
Satd. Flow (perm)	3433	3246		3400	3384			3387	1456		3533	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	262	102	672	907	126	288	1112	377	52	1286	320
RTOR Reduction (vph)	0	5	0	0	12	0	0	0	222	0	42	0
Lane Group Flow (vph)	118	359	0	672	1021	0	0	1400	155	0	1616	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			6			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Effective Green, g (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Actuated g/C Ratio	0.05	0.17		0.26	0.39			0.41	0.41		0.41	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	181	564		877	1318			1390	598		1450	
v/s Ratio Prot	0.03	c0.11		0.20	c0.30							
v/s Ratio Perm								0.41	0.11		c0.46	
v/c Ratio	0.65	0.64		0.77	0.77			3.65d	0.26		1.11	
Uniform Delay, d1	44.1	36.5		32.6	25.4			28.0	18.5		28.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	6.3	1.7		3.6	4.5			25.9	0.1		61.5	
Delay (s)	50.4	38.2		36.2	29.9			53.9	18.6		89.5	
Level of Service	D	D		D	C			D	B		F	
Approach Delay (s)		41.2			32.4			46.4			89.5	
Approach LOS		D			C			D			F	

Intersection Summary				
HCM Average Control Delay	54.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	112.7%	ICU Level of Service	H	
Analysis Period (min)	15			
d Defacto Left Lane. Recode with 1 though lane as a left lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
32: 20th St #3 & Lakeside Dr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	570	56	532	995	192	1129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.99		1.00	1.00	0.91	0.88
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.89	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4785		3367	4893	2863	1265
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4785		3367	4893	2863	1265
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.94	0.92
Adj. Flow (vph)	620	58	578	1082	204	1227
RTOR Reduction (vph)	13	0	0	0	347	347
Lane Group Flow (vph)	665	0	578	1082	471	266
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	17.0		19.0	40.0	32.0	32.0
Effective Green, g (s)	17.0		19.0	40.0	32.0	32.0
Actuated g/C Ratio	0.21		0.24	0.50	0.40	0.40
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1017		800	2447	1145	506
v/s Ratio Prot	c0.14		c0.17	0.22	0.16	
v/s Ratio Perm						c0.21
v/c Ratio	0.65		0.72	0.44	0.41	0.52
Uniform Delay, d1	28.8		28.1	12.8	17.2	18.2
Progression Factor	1.29		1.08	0.94	1.00	1.00
Incremental Delay, d2	2.9		2.3	0.2	1.1	3.9
Delay (s)	40.2		32.5	12.3	18.3	22.1
Level of Service	D		C	B	B	C
Approach Delay (s)	40.2			19.3	19.9	
Approach LOS	D			B	B	

Intersection Summary				
HCM Average Control Delay	23.3	HCM Level of Service		C
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization	71.5%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
33: 20th St #3 & Driveway — 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SBR2
Lane Configurations											
Volume (vph)	175	124	516	555	116	102	62	0	451	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.95		1.00	1.00	0.83			0.96	0.91	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.94		1.00	1.00	0.85			0.93	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4424		1770	3406	1317			1529	1407	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4424		1770	3406	1317			1529	1407	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	135	561	603	126	111	67	0	490	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	42	226	0	0
Lane Group Flow (vph)	325	0	561	603	126	0	0	303	97	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Effective Green, g (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Actuated g/C Ratio	0.21		0.34	0.48	0.48			0.30	0.30	0.08	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	940		597	1618	626			459	422	121	1611
v/s Ratio Prot	c0.07		c0.32	0.18				c0.20		0.02	
v/s Ratio Perm					0.10				0.07		0.01
v/c Ratio	0.35		0.94	0.37	0.20			0.66	0.23	0.27	0.01
Uniform Delay, d1	26.8		25.7	13.4	12.2			24.4	21.1	34.9	0.0
Progression Factor	1.00		0.63	0.78	0.85			1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0		23.0	0.6	0.7			7.3	1.3	5.5	0.0
Delay (s)	27.8		39.2	11.1	11.0			31.7	22.3	40.4	0.0
Level of Service	C		D	B	B			C	C	D	A
Approach Delay (s)	27.8			23.3				27.2			
Approach LOS	C			C				C			

Intersection Summary				
HCM Average Control Delay	25.2	HCM Level of Service		C
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
34: Jackson St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	19	1	1040	362	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1507			1630	1559	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1507			1630	1559	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92
Adj. Flow (vph)	201	21	1	1072	393	113
RTOR Reduction (vph)	5	0	0	0	14	0
Lane Group Flow (vph)	217	0	0	1073	492	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	13.0			55.0	55.0	
Effective Green, g (s)	13.0			55.0	55.0	
Actuated g/C Ratio	0.17			0.73	0.73	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	261			1195	1143	
v/s Ratio Prot	c0.14				0.32	
v/s Ratio Perm				c0.66		
v/c Ratio	0.83			0.90	0.43	
Uniform Delay, d1	29.9			7.8	3.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	25.5			10.7	1.2	
Delay (s)	55.4			18.5	5.1	
Level of Service	E			B	A	
Approach Delay (s)	55.4			18.5	5.1	
Approach LOS	E			B	A	

Intersection Summary				
HCM Average Control Delay	19.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	73.7%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
35: Lakeside Dr & 19th St — 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	406	8	0	0	0	0	221	1039	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3318	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	441	9	0	0	0	0	240	1129	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	450	0	0	0	0	0	240	1129	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.5						21.0	45.0		
Effective Green, g (s)		17.5						21.0	41.5		
Actuated g/C Ratio		0.39						0.47	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		602						1548	1428		
v/s Ratio Prot		0.29						0.07			
v/s Ratio Perm									c0.73		
v/c Ratio		0.75						0.16	0.79		
Uniform Delay, d1		11.8						6.9	0.5		
Progression Factor		1.00						1.00	1.00		
Incremental Delay, d2		8.3						0.2	4.5		
Delay (s)		20.1						7.1	5.0		
Level of Service		C						A	A		
Approach Delay (s)	20.1				0.0			5.4		0.0	
Approach LOS	C				A			A		A	

Intersection Summary				
HCM Average Control Delay	9.0	HCM Level of Service		A
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		3.0
Intersection Capacity Utilization	67.7%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
36: 17th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	66	167	0	0	0	0	0	0	80	375	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.89									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2812									4779	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2812									4779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	182	0	0	0	0	0	0	87	408	0
RTOR Reduction (vph)	0	119	0	0	0	0	0	0	0	0	43	0
Lane Group Flow (vph)	0	135	0	0	0	0	0	0	0	0	452	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		15.5									23.0	
Effective Green, g (s)		15.5									23.0	
Actuated g/C Ratio		0.34									0.51	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		969									2443	
v/s Ratio Prot		c0.05										
v/s Ratio Perm											0.09	
v/c Ratio		0.14									0.19	
Uniform Delay, d1		10.2									5.9	
Progression Factor		1.00									2.59	
Incremental Delay, d2		0.3									0.1	
Delay (s)		10.5									15.5	
Level of Service		B									B	
Approach Delay (s)		10.5			0.0			0.0			15.5	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	13.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.17			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	50.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
38: 14th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	187	135	156	930	0	0	0	0	212	359	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		2983			3231					1265	3143	
Flt Permitted		1.00			0.84					0.95	1.00	
Satd. Flow (perm)		2983			2733					1265	3143	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	195	141	170	1011	0	0	0	0	228	386	0
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	261	0	0	1181	0	0	0	0	198	416	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1392			1275					478	1187	
v/s Ratio Prot		0.09										
v/s Ratio Perm					c0.43					c0.16	0.13	
v/c Ratio		0.19			0.93					0.41	0.35	
Uniform Delay, d1		7.0			11.3					10.3	10.0	
Progression Factor		1.00			1.00					1.69	1.68	
Incremental Delay, d2		0.3			12.8					2.6	0.8	
Delay (s)		7.3			24.1					20.1	17.7	
Level of Service		A			C					C	B	
Approach Delay (s)		7.3			24.1			0.0			18.4	
Approach LOS		A			C			A			B	

Intersection Summary				
HCM Average Control Delay	19.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	68.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
39: 14th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	379	0	0	1103	868	139	476	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.83		0.99				
Flpb, ped/bikes		1.00			1.00	1.00		0.96				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		0.99			1.00	1.00		0.99				
Satd. Flow (prot)		3178			3471	1309		4538				
Flt Permitted		0.71			1.00	1.00		0.99				
Satd. Flow (perm)		2285			3471	1309		4538				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	408	0	0	1161	914	151	517	43	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	7	0	7	0	0	0	0
Lane Group Flow (vph)	0	469	0	0	1161	907	0	704	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		72.0			72.0	72.0		19.5				
Effective Green, g (s)		72.0			72.0	72.0		19.5				
Actuated g/C Ratio		0.72			0.72	0.72		0.20				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1645			2499	942		885				
v/s Ratio Prot					0.33							
v/s Ratio Perm		0.21				c0.69		0.16				
v/c Ratio		0.29			0.46	0.96		0.80				
Uniform Delay, d1		4.9			5.9	12.8		38.3				
Progression Factor		1.00			0.29	0.38		1.00				
Incremental Delay, d2		0.4			0.4	16.7		4.7				
Delay (s)		5.4			2.1	21.5		43.0				
Level of Service		A			A	C		D				
Approach Delay (s)		5.4			10.7			43.0			0.0	
Approach LOS		A			B			D			A	

Intersection Summary				
HCM Average Control Delay	17.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	101.8%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
40: 13th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	447	90	0	0	0	0	0	0	85	497	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5938									4752	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5938									4752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	486	98	0	0	0	0	0	0	92	540	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	0	52	0
Lane Group Flow (vph)	0	532	0	0	0	0	0	0	0	0	580	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2771									1795	
v/s Ratio Prot		c0.09										
v/s Ratio Perm											0.12	
v/c Ratio		0.19									0.32	
Uniform Delay, d1		7.0									9.9	
Progression Factor		1.00									1.32	
Incremental Delay, d2		0.2									0.4	
Delay (s)		7.2									13.5	
Level of Service		A									B	
Approach Delay (s)		7.2			0.0			0.0			13.5	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	32.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
41: 13th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	344	0	0	0	0	0	647	175	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.92			
Flpb, ped/bikes	0.98	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1512	4873						4831	1450			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1512	4873						4831	1450			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	374	0	0	0	0	0	703	190	0	0	0
RTOR Reduction (vph)	28	0	0	0	0	0	0	0	110	0	0	0
Lane Group Flow (vph)	21	374	0	0	0	0	0	703	80	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)		5	5			0		10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	655	2112						2040	612			
v/s Ratio Prot		c0.08						c0.15				
v/s Ratio Perm	0.01								0.06			
v/c Ratio	0.03	0.18						0.34	0.13			
Uniform Delay, d1	7.3	7.8						8.8	8.0			
Progression Factor	0.91	0.86						2.06	5.28			
Incremental Delay, d2	0.1	0.2						0.4	0.4			
Delay (s)	6.8	6.9						18.5	42.4			
Level of Service	A	A						B	D			
Approach Delay (s)		6.9			0.0			23.6			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM Average Control Delay			18.2		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.26									
Actuated Cycle Length (s)			45.0		Sum of lost time (s)				6.5			
Intersection Capacity Utilization			52.0%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis — Measure DD
42: 12th St #2 & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	444	1550	0	0	0	0	0	591	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5921						4669	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5921						4669	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	483	1685	0	0	0	0	0	642	113
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	2107	0	0	0	0	0	751	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2763						1764	
v/s Ratio Prot											c0.16	
v/s Ratio Perm					0.36							
v/c Ratio					0.76						0.43	
Uniform Delay, d1					9.9						10.4	
Progression Factor					0.26						1.63	
Incremental Delay, d2					0.5						0.7	
Delay (s)					3.1						17.7	
Level of Service					A						B	
Approach Delay (s)		0.0			3.1			0.0			17.7	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay			6.8		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			45.0		Sum of lost time (s)				7.0			
Intersection Capacity Utilization			50.3%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis — Measure DD
43: 12th St #2 & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1860	88	203	712	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4653			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4653			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2000	95	218	766	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2083	0	0	983	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1965			2305				
v/s Ratio Prot					c0.45							
v/s Ratio Perm								c0.17				
v/c Ratio					1.06			0.43				
Uniform Delay, d1					13.0			10.1				
Progression Factor					1.00			1.70				
Incremental Delay, d2					38.5			0.5				
Delay (s)					51.5			17.6				
Level of Service					D			B				
Approach Delay (s)		0.0			51.5			17.6			0.0	
Approach LOS		A			D			B			A	
Intersection Summary												
HCM Average Control Delay			40.7		HCM Level of Service				D			
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			45.0		Sum of lost time (s)				8.5			
Intersection Capacity Utilization			59.0%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis — Measure DD
44: 11th St & Madison St — 5/23/2007

Movement	SBL	SBT	SEL	SET	SER
Lane Configurations					
Volume (vph)	64	949	28	350	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.97	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.95	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4796	1548	4396	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4796	1548	4396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	1032	30	380	189
RTOR Reduction (vph)	0	0	0	16	0
Lane Group Flow (vph)	0	1102	30	553	0
Confl. Peds. (#/hr)	70			70	
Confl. Bikes (#/hr)				16	
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1758	
v/s Ratio Prot			0.02	c0.13	
v/s Ratio Perm		0.23			
v/c Ratio		0.61	0.05	0.31	
Uniform Delay, d1		11.3	8.3	9.3	
Progression Factor		1.17	1.00	1.00	
Incremental Delay, d2		1.3	0.1	0.5	
Delay (s)		14.5	8.4	9.7	
Level of Service		B	A	A	
Approach Delay (s)		14.5		9.7	
Approach LOS		B		A	
Intersection Summary					
HCM Average Control Delay			12.8	HCM Level of Service	B
HCM Volume to Capacity ratio			0.46		
Actuated Cycle Length (s)			45.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization			41.3%	ICU Level of Service	A
Analysis Period (min)			15		
c Critical Lane Group					

HCM Signalized Intersection Capacity Analysis — Measure DD
46: E. 10th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↱	
Volume (vph)	0	0	0	303	475	0	0	0	0	107	1082	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3132						4727	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3132						4727	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	329	516	0	0	0	0	116	1176	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	18	0
Lane Group Flow (vph)	0	0	0	0	845	0	0	0	0	0	1365	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1114						2416	
v/s Ratio Prot												
v/s Ratio Perm					0.27						0.29	
v/c Ratio					0.76						0.57	
Uniform Delay, d1					12.8						7.6	
Progression Factor					1.16						0.38	
Incremental Delay, d2					0.5						0.8	
Delay (s)					15.3						3.7	
Level of Service					B						A	
Approach Delay (s)		0.0			15.3			0.0			3.7	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.1	HCM Level of Service		A
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	53.9%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
47: E. 10th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↱			↰↑↑↱				
Volume (vph)	9	61	0	0	654	150	114	773	103	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3292			1564			5969				
Flt Permitted		0.73			1.00			0.99				
Satd. Flow (perm)		2425			1564			5969				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	66	0	0	711	163	124	840	112	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	76	0	0	855	0	0	1032	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			15			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		808			521			2918				
v/s Ratio Prot					c0.55							
v/s Ratio Perm		0.03						0.17				
v/c Ratio		0.09			1.64			0.35				
Uniform Delay, d1		10.3			15.0			7.1				
Progression Factor		1.78			1.00			0.73				
Incremental Delay, d2		0.2			297.4			0.3				
Delay (s)		18.6			312.4			5.5				
Level of Service		B			F			A				
Approach Delay (s)		18.6			312.4			5.5			0.0	
Approach LOS		B			F			A			A	

Intersection Summary				
HCM Average Control Delay	138.4	HCM Level of Service		F
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service		C
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
48: 8th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↰↑↑↱	
Volume (vph)	0	0	0	413	780	0	0	0	0	0	1423	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					5946						4769	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					5946						4769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	449	848	0	0	0	0	0	1547	100
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	1290	0	0	0	0	0	1631	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2246						2226	
v/s Ratio Prot											c0.34	
v/s Ratio Perm					0.22							
v/c Ratio					0.57						0.73	
Uniform Delay, d1					11.1						9.7	
Progression Factor					1.29						1.05	
Incremental Delay, d2					0.9						1.8	
Delay (s)					15.3						12.0	
Level of Service					B						B	
Approach Delay (s)		0.0			15.3			0.0			12.0	
Approach LOS		A			B			A			B	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service		B
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	59.4%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
49: 8th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	1016	100	203	1084	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6045			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6045			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1104	109	221	1178	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1198	0	0	1384	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2418			2563				
v/s Ratio Prot					c0.20							
v/s Ratio Perm								0.23				
v/c Ratio					0.50			0.54				
Uniform Delay, d1					10.1			9.7				
Progression Factor					1.00			2.04				
Incremental Delay, d2					0.7			0.4				
Delay (s)					10.8			20.3				
Level of Service					B			C				
Approach Delay (s)		0.0			10.8			20.3			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM Average Control Delay	15.9	HCM Level of Service		B
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	42.3%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

HCM Signalized Intersection Capacity Analysis — Measure DD
50: 7th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑	
Volume (vph)	0	647	564	0	0	0	0	0	0	270	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.97									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.93									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5561									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5561									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	703	613	0	0	0	0	0	0	293	1715	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	1314	0	0	0	0	0	0	0	0	1955	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2472									1904	
v/s Ratio Prot		c0.24										
v/s Ratio Perm											0.41	
v/c Ratio		1.04dr									1.03	
Uniform Delay, d1		9.1									13.5	
Progression Factor		1.00									1.72	
Incremental Delay, d2		0.8									24.6	
Delay (s)		9.9									47.9	
Level of Service		A									D	
Approach Delay (s)		9.9			0.0			0.0			47.9	
Approach LOS		A			A			A			D	

Intersection Summary			
HCM Average Control Delay	32.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
51: 7th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑						↑↑↱				
Volume (vph)	150	739	0	0	0	0	0	1211	310	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6062						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6062						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	803	0	0	0	0	0	1316	337	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	959	0	0	0	0	0	1608	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2425						1846				
v/s Ratio Prot								c0.35				
v/s Ratio Perm		0.16										
v/c Ratio		0.40						0.87				
Uniform Delay, d1		9.6						12.4				
Progression Factor		1.19						1.00				
Incremental Delay, d2		0.4						6.0				
Delay (s)		11.8						18.4				
Level of Service		B						B				
Approach Delay (s)		11.8			0.0			18.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
52: Lakeshore & 1st Ave #2 — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↰↑	↑↑	↱
Volume (vph)	10	10	10	427	2039	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.91			1.00	1.00	0.66
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1539			3405	3406	1051
Flt Permitted	0.98			0.88	1.00	1.00
Satd. Flow (perm)	1539			3007	3406	1051
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	464	2216	11
RTOR Reduction (vph)	10	0	0	0	0	1
Lane Group Flow (vph)	12	0	0	475	2216	10
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	5.6			86.4	86.4	86.4
Effective Green, g (s)	5.6			86.4	86.4	86.4
Actuated g/C Ratio	0.06			0.86	0.86	0.86
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	86			2598	2943	908
v/s Ratio Prot	c0.01				c0.65	
v/s Ratio Perm				0.16		0.01
v/c Ratio	0.14			0.18	0.75	0.01
Uniform Delay, d1	44.9			1.1	2.6	0.9
Progression Factor	1.00			0.27	0.41	0.32
Incremental Delay, d2	0.3			0.0	1.2	0.0
Delay (s)	45.2			0.3	2.3	0.3
Level of Service	D			A	A	A
Approach Delay (s)	45.2			0.3	2.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	2.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
53: 12th St #1#2 & Convention Ctr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑↑		↱
Volume (vph)	909	333	0	3585	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	0.94			1.00		0.79
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.96			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4440			4893		1276
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4440			4893		1276
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	988	362	0	3897	0	11
RTOR Reduction (vph)	33	0	0	0	0	11
Lane Group Flow (vph)	1317	0	0	3897	0	0
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	87.9			87.9		4.1
Effective Green, g (s)	87.9			87.9		4.1
Actuated g/C Ratio	0.88			0.88		0.04
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3903			4301		52
v/s Ratio Prot	0.30			c0.80		
v/s Ratio Perm						c0.00
v/c Ratio	0.34			0.91		0.01
Uniform Delay, d1	1.0			3.6		46.0
Progression Factor	0.79			0.90		1.00
Incremental Delay, d2	0.2			0.4		0.0
Delay (s)	1.0			3.6		46.0
Level of Service	A			A		D
Approach Delay (s)	1.0			3.6	46.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	3.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
54: 11th-12th St #1#2 & 14th St — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	414	1805	1780	628	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	450	1962	1935	900	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	0	445	1962	1935	900	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		67.6	67.6	100.0	24.4	
Effective Green, g (s)		67.6	67.6	100.0	24.4	
Actuated g/C Ratio		0.68	0.68	1.00	0.24	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2348	2276	3254	1217	
v/s Ratio Prot		0.13	c0.58	0.59	c0.18	
v/s Ratio Perm						
v/c Ratio		0.19	0.86	0.59	0.74	
Uniform Delay, d1		6.0	12.6	0.0	34.9	
Progression Factor		1.00	0.64	1.00	0.93	
Incremental Delay, d2		0.0	1.7	0.4	4.0	
Delay (s)		6.0	9.8	0.4	36.4	
Level of Service		A	A	A	D	
Approach Delay (s)	6.0			5.1	36.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
55: 13th St & 14th St — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	409	0	1971	419	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.70		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		2518		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		2518		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	445	0	2142	455	0
RTOR Reduction (vph)	0	415	0	0	0	0
Lane Group Flow (vph)	0	30	0	2142	455	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		6.8		85.2	85.2	
Effective Green, g (s)		6.8		85.2	85.2	
Actuated g/C Ratio		0.07		0.85	0.85	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		171		2957	2772	
v/s Ratio Prot				c0.62	0.14	
v/s Ratio Perm		c0.01				
v/c Ratio		0.18		0.72	0.16	
Uniform Delay, d1		44.0		2.9	1.3	
Progression Factor		1.00		0.62	0.88	
Incremental Delay, d2		0.2		1.4	0.1	
Delay (s)		44.1		3.1	1.2	
Level of Service		D		A	A	
Approach Delay (s)	44.1			3.1	1.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	11	293	518	555	624	271	473	197	154	680	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1619	1441	1736	3539	1286	1610	2960			3489	1297
Flt Permitted		0.36	1.00	0.63	1.00	1.00	0.95	0.91			0.67	1.00
Satd. Flow (perm)		600	1441	1143	3539	1286	1610	2711			2362	1297
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	12	318	563	603	570	291	509	212	166	731	344
RTOR Reduction (vph)	0	11	200	0	0	202	0	42	0	0	0	39
Lane Group Flow (vph)	0	135	86	563	603	368	262	708	0	0	897	305
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		180	432	343	1062	386	242	1664			958	526
v/s Ratio Prot					0.17		c0.16	0.06				
v/s Ratio Perm		0.22	0.06	c0.49		0.29		0.19			c0.38	0.24
v/c Ratio		0.75	0.20	1.64	0.57	0.95	1.08	0.43			0.94	0.58
Uniform Delay, d1		28.4	23.4	31.5	26.6	30.9	38.2	9.7			25.6	20.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.88	2.81			1.00	1.00
Incremental Delay, d2		24.5	1.0	301.5	2.2	35.3	74.4	0.6			17.2	4.6
Delay (s)		52.9	24.5	333.0	28.8	66.2	108.3	27.8			42.9	25.4
Level of Service		D	C	F	C	E	F	C			D	C
Approach Delay (s)		34.1			139.7			48.6			38.0	
Approach LOS		C			F			D			D	

Intersection Summary				
HCM Average Control Delay	80.0	HCM Level of Service		F
HCM Volume to Capacity ratio	1.21			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		13.0
Intersection Capacity Utilization	108.6%	ICU Level of Service		G
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	1108	346	0	0	0	0	519	637	712	844	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.97						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4606						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4606						3539	1296	1770	3318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	296	1204	376	0	0	0	0	546	671	774	917	0
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1827	0	0	0	0	0	546	671	774	917	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1535						1003	1296	423	1880	
v/s Ratio Prot								0.15		c0.44		
v/s Ratio Perm		0.40							c0.52		0.28	
v/c Ratio		1.19						0.54	0.52	1.83	0.49	
Uniform Delay, d1		30.0						27.3	0.0	34.2	11.7	
Progression Factor		1.00						0.71	1.00	1.25	1.09	
Incremental Delay, d2		92.5						0.2	0.1	374.2	0.1	
Delay (s)		122.5						19.6	0.1	417.1	12.8	
Level of Service		F						B	A	F	B	
Approach Delay (s)		122.5			0.0			8.9			197.9	
Approach LOS		F			A			A			F	

Intersection Summary				
HCM Average Control Delay	120.2	HCM Level of Service		F
HCM Volume to Capacity ratio	1.11			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	100.4%	ICU Level of Service		G
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
3: El Embarcadero WB & Grand Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	207	133	1096	708	213	1119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		5.0		4.0	5.0
Lane Util. Factor	1.00		0.95		1.00	0.95
Frpb, ped/bikes	0.99		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.95		0.94		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1688		3331		1770	3318
Flt Permitted	0.97		1.00		0.95	1.00
Satd. Flow (perm)	1688		3331		1770	3318
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	225	145	1154	745	232	1216
RTOR Reduction (vph)	26	0	118	0	0	0
Lane Group Flow (vph)	344	0	1782	0	232	1216
Confl. Peds. (#/hr)		17				
Confl. Bikes (#/hr)		2				
Parking (#/hr)						5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	19.5		45.0		12.5	61.5
Effective Green, g (s)	19.5		45.0		12.5	61.5
Actuated g/C Ratio	0.22		0.50		0.14	0.68
Clearance Time (s)	4.0		5.0		4.0	5.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	366		1666		246	2267
v/s Ratio Prot	c0.20		c0.53		c0.13	0.37
v/s Ratio Perm						
v/c Ratio	0.94		1.07		0.94	0.54
Uniform Delay, d1	34.7		22.5		38.4	7.1
Progression Factor	1.00		1.00		1.05	0.79
Incremental Delay, d2	31.7		43.2		35.6	0.7
Delay (s)	66.4		65.7		75.9	6.3
Level of Service	E		E		E	A
Approach Delay (s)	66.4		65.7			17.5
Approach LOS	E		E			B

Intersection Summary				
HCM Average Control Delay	47.0	HCM Level of Service		D
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		13.0
Intersection Capacity Utilization	95.9%	ICU Level of Service		F
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	0	368	243	1230	270	215	441	0	0	260	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.88			1.00	0.80	1.00	1.00			0.86	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	901			3510	1253	1770	3539			2650	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	901			3510	1253	1770	3539			2650	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	0	400	261	1323	290	234	479	0	0	283	230
RTOR Reduction (vph)	0	372	0	0	0	79	0	0	0	0	133	0
Lane Group Flow (vph)	103	40	0	0	1584	211	234	479	0	0	380	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	7.0	7.0			43.2	43.2	15.5	37.0			17.5	
Effective Green, g (s)	7.0	7.0			43.2	43.2	15.5	37.0			17.5	
Actuated g/C Ratio	0.07	0.07			0.44	0.44	0.16	0.37			0.18	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	119	64			1538	548	278	1327			470	
v/s Ratio Prot	c0.06	0.04			c0.45		c0.13	0.14			c0.14	
v/s Ratio Perm						0.17						
v/c Ratio	0.87	0.63			1.03	0.38	0.84	0.36			0.81	
Uniform Delay, d1	45.4	44.6			27.7	18.8	40.4	22.3			39.0	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	42.7	13.9			31.4	2.0	19.3	0.1			9.3	
Delay (s)	88.1	58.5			59.1	20.8	59.7	22.4			48.3	
Level of Service	F	E			E	C	E	C			D	
Approach Delay (s)		64.4			53.2			34.6			48.3	
Approach LOS		E			D			C			D	

Intersection Summary				
HCM Average Control Delay	50.4	HCM Level of Service		D
HCM Volume to Capacity ratio	0.93			
Actuated Cycle Length (s)	98.7	Sum of lost time (s)		15.5
Intersection Capacity Utilization	103.6%	ICU Level of Service		G
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	296	1944	168	0	0	0	0	353	880	575	307	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00						0.91		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.99						0.89		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1411	4723						2709		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.10	1.00	
Satd. Flow (perm)	1411	4723						2709		180	3539	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	317	2068	179	0	0	0	0	372	926	625	334	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	285	2269	0	0	0	0	0	1297	0	625	334	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)						0		5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1469						1144		309	2084	
v/s Ratio Prot								0.48		c0.26	0.09	
v/s Ratio Perm	0.20	0.48								c0.93		
v/c Ratio	0.65	1.54						1.70dr		2.02	0.16	
Uniform Delay, d1	26.8	31.0						26.0		26.4	8.4	
Progression Factor	1.15	1.13						1.00		1.00	1.00	
Incremental Delay, d2	0.7	245.3						71.4		471.4	0.2	
Delay (s)	31.4	280.2						97.4		497.9	8.6	
Level of Service	C	F						F		F	A	
Approach Delay (s)		252.5			0.0			97.4			327.5	
Approach LOS		F			A			F			F	

Intersection Summary				
HCM Average Control Delay	225.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.82			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	122.6%	ICU Level of Service	H	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: El Embarcadero WB & Lakeshore Av

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	496	425	189	487	243	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	2959	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	3539	2959	
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.93	0.93
Adj. Flow (vph)	539	462	199	513	261	162
RTOR Reduction (vph)	0	276	0	0	129	0
Lane Group Flow (vph)	539	186	199	513	294	0
Confl. Peds. (#/hr)			44			44
Confl. Bikes (#/hr)						16
Parking (#/hr)					5	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	21.1	21.1	8.6	23.3	10.7	
Effective Green, g (s)	21.1	21.1	8.6	23.3	10.7	
Actuated g/C Ratio	0.40	0.40	0.16	0.44	0.20	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	713	637	290	1574	604	
v/s Ratio Prot	c0.30		c0.11	0.14	c0.10	
v/s Ratio Perm		0.12				
v/c Ratio	0.76	0.29	0.69	0.33	0.49	
Uniform Delay, d1	13.4	10.6	20.6	9.4	18.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.1	0.1	5.3	0.0	0.2	
Delay (s)	17.5	10.7	25.9	9.5	18.7	
Level of Service	B	B	C	A	B	
Approach Delay (s)	14.4			14.1	18.7	
Approach LOS	B			B	B	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	60.9%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	655	0	0	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	0	712	0	0	736
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	712	0	0	736
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			0.44			c0.45
v/s Ratio Perm						
v/c Ratio			0.52			0.54
Uniform Delay, d1			2.6			2.7
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.2
Delay (s)			2.7			2.9
Level of Service			A			A
Approach Delay (s)	0.0		2.7			2.9
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.8	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8	
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	32	113	584	80	73	566
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.86		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1245		1572		1770	1863
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1245		1572		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	123	635	87	79	615
RTOR Reduction (vph)	108	0	7	0	0	0
Lane Group Flow (vph)	50	0	715	0	79	615
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.4		25.6		2.3	31.9
Effective Green, g (s)	5.4		25.6		2.3	31.9
Actuated g/C Ratio	0.12		0.59		0.05	0.74
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	155		929		94	1373
v/s Ratio Prot	c0.04		c0.45		c0.04	0.33
v/s Ratio Perm						
v/c Ratio	0.32		0.77		0.84	0.45
Uniform Delay, d1	17.3		6.6		20.3	2.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		3.5		44.4	0.1
Delay (s)	17.7		10.1		64.7	2.3
Level of Service	B		B		E	A
Approach Delay (s)	17.7		10.1			9.4
Approach LOS	B		B			A

Intersection Summary				
HCM Average Control Delay	10.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	43.3	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	62.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

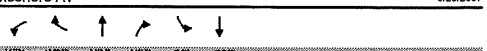
HCM Unsignalized Intersection Capacity Analysis — Measure DD
9: Boden Way & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	26	655	0	13	699
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.94	0.94
Hourly flow rate (vph)	1	28	712	0	14	744
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	29	712	14	744
Volume Left	1	0	14	0
Volume Right	28	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	46.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
12: Wesley Ave & Lakeshore Av — 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	5	608	12	27	660
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	5	661	13	29	717
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.78	0.72			0.72	
vC, conflicting volume	1460	680			685	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1117	361			367	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			97	
cM capacity (veh/h)	170	487			849	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	12	674	29	717
Volume Left	7	0	29	0
Volume Right	5	13	0	0
cSH	241	1700	849	1700
Volume to Capacity	0.05	0.40	0.03	0.42
Queue Length 95th (ft)	4	0	3	0
Control Delay (s)	20.7	0.0	9.4	0.0
Lane LOS	C		A	
Approach Delay (s)	20.7	0.0	0.4	
Approach LOS	C			

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service		A
Analysis Period (min)	15			

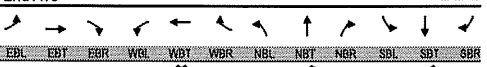
HCM Unsignalized Intersection Capacity Analysis — Measure DD
16: E 16th St & 1st Ave #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	1309	35	0	1219
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1423	38	0	1325
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.88	0.80			0.80	
vC, conflicting volume	2174	870			1531	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1242	346			1169	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	139	462			448	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	949	512	662	662
Volume Left	0	0	0	0	0
Volume Right	26	0	38	0	0
cSH	462	1700	1700	1700	1700
Volume to Capacity	0.06	0.56	0.30	0.39	0.39
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.2	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	56.8%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
20: Foothill Blvd #2 & 2nd Ave — 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	27	249	13	58	143	0	0	18	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	29	271	14	63	155	0	0	20	34
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	286			15			288	359	15	415	352	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			15			288	359	15	415	352	178
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	72	100	100	96	96
cM capacity (veh/h)	1272			1581			576	548	1047	398	553	833

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	165	149	218	53
Volume Left	29	0	63	0
Volume Right	0	14	0	34
cSH	1581	1700	556	702
Volume to Capacity	0.02	0.09	0.39	0.08
Queue Length 95th (ft)	1	0	46	6
Control Delay (s)	1.4	0.0	15.6	10.5
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.6	10.5
Approach LOS			C	B

Intersection Summary				
Average Delay	7.2			
Intersection Capacity Utilization	32.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	13	67	609	88	141	577
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.92		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1321		1586		1770	1630
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1321		1586		1770	1630
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.92	0.92
Adj. Flow (vph)	14	73	655	95	153	627
RTOR Reduction (vph)	55	0	6	0	0	0
Lane Group Flow (vph)	32	0	744	0	153	627
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		41.0		8.0	53.0
Effective Green, g (s)	20.0		41.0		8.0	53.0
Actuated g/C Ratio	0.25		0.51		0.10	0.66
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	330		813		177	1080
v/s Ratio Prot	c0.02		c0.47		c0.09	0.38
v/s Ratio Perm						
v/c Ratio	0.10		0.91		0.86	0.58
Uniform Delay, d1	23.1		17.9		35.5	7.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.6		16.6		39.4	2.3
Delay (s)	23.7		34.5		74.9	9.7
Level of Service	C		C		E	A
Approach Delay (s)	23.7		34.5			22.5
Approach LOS	C		C			C

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	469	51	546	672	135	611
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3355		2953		1770	3539
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3355		2953		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	55	593	730	147	664
RTOR Reduction (vph)	15	0	300	0	0	0
Lane Group Flow (vph)	572	0	1023	0	147	664
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	14.4		25.2		6.1	34.3
Effective Green, g (s)	14.4		25.2		6.1	34.3
Actuated g/C Ratio	0.26		0.46		0.11	0.63
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	883		1360		197	2219
v/s Ratio Prot	c0.17		c0.35		c0.08	
v/s Ratio Perm						0.19
v/c Ratio	0.65		0.75		0.75	0.30
Uniform Delay, d1	17.9		12.2		23.5	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.2		3.9		12.6	0.3
Delay (s)	19.1		16.0		36.1	5.0
Level of Service	B		B		D	A
Approach Delay (s)	19.1		16.0			10.7
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Foothill Blvd #2 & Lakeshore Av #2

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	216	113	1333	0	0	1001
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3188		3406			3406
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3188		3406			3406
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	234	122	1433	0	0	1088
RTOR Reduction (vph)	19	0	0	0	0	0
Lane Group Flow (vph)	337	0	1433	0	0	1088
Confl. Peds. (#/hr)		42				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	10.6		32.9			32.9
Effective Green, g (s)	10.6		32.9			32.9
Actuated g/C Ratio	0.21		0.66			0.66
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	676		2241			2241
v/s Ratio Prot	c0.11		c0.42			0.32
v/s Ratio Perm						
v/c Ratio	0.50		0.64			0.49
Uniform Delay, d1	17.4		5.0			4.3
Progression Factor	1.00		0.41			1.00
Incremental Delay, d2	0.2		1.2			0.8
Delay (s)	17.6		3.3			5.1
Level of Service	B		A			A
Approach Delay (s)	17.6		3.3			5.1
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1344	310	254	1026
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.97			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3291			3396
Flt Permitted			1.00			0.51
Satd. Flow (perm)			3291			1760
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1461	337	276	1115
RTOR Reduction (vph)	0	0	15	0	0	0
Lane Group Flow (vph)	0	0	1783	0	0	1391
Confl. Peds. (#/hr)				26	70	
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type					pm+pt	
Protected Phases			2		1 4	6
Permitted Phases					6	
Actuated Green, G (s)			37.5			42.0
Effective Green, g (s)			37.5			42.0
Actuated g/C Ratio			0.75			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2468			1626
v/s Ratio Prot			0.54			c0.08
v/s Ratio Perm						c0.64
v/c Ratio			0.72			0.86
Uniform Delay, d1			3.4			2.3
Progression Factor			1.00			3.77
Incremental Delay, d2			1.9			4.1
Delay (s)			5.3			12.7
Level of Service			A			B
Approach Delay (s)	0.0		5.3			12.7
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
18: International Blvd & 1st Ave #1#2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	314	78	1586	626	10	1016
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.98		1.00	0.94		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3241		3406	2575		3405
Flt Permitted	0.96		1.00	1.00		0.93
Satd. Flow (perm)	3241		3406	2575		3178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	341	85	1724	680	11	1104
RTOR Reduction (vph)	10	0	0	241	0	0
Lane Group Flow (vph)	416	0	1724	439	0	1115
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	13.0		38.3	38.3		38.3
Effective Green, g (s)	13.0		38.3	38.3		38.3
Actuated g/C Ratio	0.22		0.65	0.65		0.65
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	711		2200	1663		2053
v/s Ratio Prot	c0.13		c0.51			
v/s Ratio Perm				0.17		0.35
v/c Ratio	0.58		0.78	0.26		0.54
Uniform Delay, d1	20.7		7.5	4.5		5.7
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.8		2.9	0.4		1.0
Delay (s)	21.5		10.4	4.9		6.8
Level of Service	C		B	A		A
Approach Delay (s)	21.5		8.8			6.8
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
19: Driveway & 1st Ave #1#2 — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	165	0	6	0	2212	1174	5	1283	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.91		1.00	0.98			0.94		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.96		1.00	0.98			0.95		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1598		3221	1371			5390		1768	4886	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1598		3221	1371			5390		1766	4886	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	179	0	7	0	2404	1276	5	1395	5
RTOR Reduction (vph)	0	12	0	0	4	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	54	0	125	57	0	0	3635	0	5	1400	0
Confl. Peds. (#/hr)	70		70	70		70			70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split							Prot	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		7.6		11.6	11.6			95.6		0.7	100.3	
Effective Green, g (s)		7.6		11.6	11.6			95.6		0.7	100.3	
Actuated g/C Ratio		0.06		0.09	0.09			0.73		0.01	0.76	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		92		284	121			3919		9	3727	
v/s Ratio Prot		c0.03		0.04	c0.04			c0.67		0.00	c0.29	
v/s Ratio Perm												
v/c Ratio		0.58		0.44	0.47			1.24dr		0.56	0.38	
Uniform Delay, d1		60.4		56.9	57.0			15.0		65.2	5.2	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		6.0		0.4	1.1			5.1		36.0	0.0	
Delay (s)		66.4		57.3	58.1			20.1		101.3	5.2	
Level of Service		E		E	E			C		F	A	
Approach Delay (s)		66.4			57.5			20.1			5.6	
Approach LOS		E			E			C			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	131.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		
dr Defacto Right Lane. Recode with 1 though lane as a right lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
22: International Blvd & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	477	61	51	147	19	159	260	251	7	37	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.96			0.95	
Flpb, ped/bikes		1.00			1.00			0.98			1.00	
Frt		0.99			0.99			0.95			0.94	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		3158			3165			1439			1447	
Flt Permitted		0.87			0.72			0.90			0.95	
Satd. Flow (perm)		2780			2310			1310			1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	518	66	55	160	21	173	283	273	8	40	39
RTOR Reduction (vph)	0	22	0	0	14	0	0	14	0	0	16	0
Lane Group Flow (vph)	0	647	0	0	222	0	0	715	0	0	71	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		26.0			26.0			48.0			48.0	
Effective Green, g (s)		26.0			26.0			48.0			48.0	
Actuated g/C Ratio		0.32			0.32			0.60			0.60	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		904			751			786			832	
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.10			c0.55			0.05	
v/c Ratio		0.72			0.30			0.91			0.09	
Uniform Delay, d1		23.7			20.2			14.1			6.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.3			0.1			16.4			0.2	
Delay (s)		26.0			20.2			30.5			7.0	
Level of Service		C			C			C			A	
Approach Delay (s)		26.0			20.2			30.5			7.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	130.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
23: E. 12TH & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	750	10	20	143	87	7	85	9	116	67	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		1.00			0.91			0.99			1.00	0.86
Flpb, ped/bikes		0.95			1.00			0.99			0.94	1.00
Frt		1.00			0.95			0.99			1.00	0.85
Flt Protected		0.98			1.00			1.00			0.97	1.00
Satd. Flow (prot)		3074			3047			1574			1698	1360
Flt Permitted		0.73			0.84			0.97			0.76	1.00
Satd. Flow (perm)		2295			2578			1535			1338	1360
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	815	11	22	155	95	8	92	10	126	73	22
RTOR Reduction (vph)	0	1	0	0	30	0	0	4	0	0	0	13
Lane Group Flow (vph)	0	1271	0	0	242	0	0	106	0	0	199	9
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5				5		5				
Turn Type	Perm			Perm		Perm				Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		8				4		4
Actuated Green, G (s)		61.5			61.5			19.0			19.0	19.0
Effective Green, g (s)		61.5			61.5			19.0			19.0	19.0
Actuated g/C Ratio		0.68			0.68			0.21			0.21	0.21
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1568			1762			324			282	287
v/s Ratio Prot												
v/s Ratio Perm		c0.55			0.09			0.07			c0.15	0.01
v/c Ratio		0.81			0.14			0.33			0.71	0.03
Uniform Delay, d1		10.1			5.0			30.1			32.9	28.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		4.7			0.2			2.7			13.9	0.2
Delay (s)		14.8			5.1			32.6			46.8	28.4
Level of Service		B			A			C			D	C
Approach Delay (s)		14.8			5.1			32.6			44.9	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

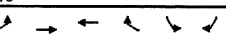
HCM Unsignalized Intersection Capacity Analysis — Measure DD
21: E 15th St #1 & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	531	33	0	0	0	0	227	16	10	35	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	577	36	0	0	0	0	247	17	11	38	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked												
vC, conflicting volume	4			619			688	672	318	506	690	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			619			688	672	318	506	690	4
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	32	97	94	89	100
cM capacity (veh/h)	1611			952			297	364	675	194	356	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	322	324	264	49
Volume Left	34	0	0	11
Volume Right	0	36	17	0
cSH	1611	1700	376	300
Volume to Capacity	0.02	0.19	0.70	0.16
Queue Length 95th (ft)	2	0	129	14
Control Delay (s)	0.9	0.0	34.3	19.3
Lane LOS	A		D	C
Approach Delay (s)	0.5		34.3	19.3
Approach LOS			D	C

Intersection Summary				
Average Delay	10.7			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
24: E. 10th St & 2nd Ave — 5/23/2007

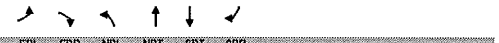


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	53	293	374	40	44	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	407	43	48	38
Pedestrians		70	70			
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520				1002	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				1002	568
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				79	92
cM capacity (veh/h)	985				224	463

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	376	450	86
Volume Left	58	0	48
Volume Right	0	43	38
cSH	985	1700	291
Volume to Capacity	0.06	0.26	0.30
Queue Length 95th (ft)	5	0	30
Control Delay (s)	1.9	0.0	22.5
Lane LOS	A		C
Approach Delay (s)	1.9	0.0	22.5
Approach LOS			C

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
37: 17th St & Lakeside Dr — 5/23/2007

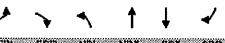


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	111	0	0	684	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	121	0	0	961	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	550	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	100	100			
cM capacity (veh/h)	465	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	60	60	480	480
Volume Left	60	60	0	0
Volume Right	0	0	0	0
cSH	465	465	1700	1700
Volume to Capacity	0.13	0.13	0.28	0.28
Queue Length 95th (ft)	11	11	0	0
Control Delay (s)	13.9	13.9	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.9		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	76.4%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
45: 11th St & Oak St — 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	46	0	0	935	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	50	0	0	984	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	316	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	641	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	50	246	246	246	246
Volume Left	50	0	0	0	0
Volume Right	0	0	0	0	0
cSH	641	1700	1700	1700	1700
Volume to Capacity	0.08	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	6	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	23.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Measure DD
25: Foothill Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	74	304	48	52	354	0	0	267	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3187			1655			1657	
Flt Permitted					0.99			0.93			1.00	
Satd. Flow (perm)					3187			1547			1657	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	80	330	52	57	385	0	0	290	15
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	447	0	0	442	0	0	302	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1324			750			803	
v/s Ratio Prot											0.18	
v/s Ratio Perm					0.14			c0.29				
v/c Ratio					0.34			0.59			0.38	
Uniform Delay, d1					12.9			12.1			10.6	
Progression Factor					1.00			1.38			1.00	
Incremental Delay, d2					0.7			2.1			1.3	
Delay (s)					13.6			18.8			11.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.6			18.8			11.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
26: International Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	571	45	49	529	81	69	343	70	72	355	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3292			3238			1611			1644	
Flt Permitted		0.92			0.87			0.88			0.85	
Satd. Flow (perm)		3028			2826			1430			1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	621	49	53	575	88	75	373	76	78	386	20
RTOR Reduction (vph)	0	9	0	0	17	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	688	0	0	699	0	0	514	0	0	482	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1374			1283			616			609	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.25			c0.36			0.34	
v/c Ratio		0.50			0.54			0.83			0.79	
Uniform Delay, d1		12.5			12.9			16.4			16.0	
Progression Factor		1.00			1.00			0.97			0.71	
Incremental Delay, d2		1.3			1.7			1.3			9.9	
Delay (s)		13.9			14.5			17.2			21.2	
Level of Service		B			B			B			C	
Approach Delay (s)		13.9			14.5			17.2			21.2	
Approach LOS		B			B			B			C	

Intersection Summary				
HCM Average Control Delay	16.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
27: E 12th Street & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	786	165	37	431	75	72	397	118	60	349	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3238			3234			1593			1630	
Flt Permitted		0.91			0.85			0.88			0.83	
Satd. Flow (perm)		2952			2748			1406			1366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	854	179	40	468	82	78	432	128	65	379	45
RTOR Reduction (vph)	0	26	0	0	20	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	1053	0	0	570	0	0	624	0	0	483	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1499			1395			541			525	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.21			c0.44			0.35	
v/c Ratio		0.70			0.41			1.15			0.92	
Uniform Delay, d1		12.2			9.9			20.0			19.1	
Progression Factor		1.00			1.00			0.87			0.86	
Incremental Delay, d2		2.8			0.9			84.2			17.6	
Delay (s)		15.0			10.8			101.6			34.1	
Level of Service		B			B			F			C	
Approach Delay (s)		15.0			10.8			101.6			34.1	
Approach LOS		B			B			F			C	

Intersection Summary				
HCM Average Control Delay	37.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	108.9%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
28: E. 8th St & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	318	1711	264	124	361	90	60	370	95	74	408	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.96	1.00		1.00	1.00		0.98	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1691	4772		1767	4657		1728	1676	1470	1724	1676	1470
Flt Permitted	0.46	1.00		0.12	1.00		0.33	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	821	4772		232	4657		594	1676	1470	671	1676	1470
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	346	1860	287	135	392	98	65	402	103	80	443	71
RTOR Reduction (vph)	0	32	0	0	50	0	0	0	2	0	0	43
Lane Group Flow (vph)	346	2115	0	135	440	0	65	402	101	80	443	28
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		2
Actuated Green, G (s)	32.0	32.0		32.0	32.0		26.0	26.0	26.0	26.0	26.0	26.0
Effective Green, g (s)	32.0	32.0		32.0	32.0		26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	404	2349		114	2293		238	670	588	268	670	588
v/s Ratio Prot		0.44			0.09			0.24			c0.26	
v/s Ratio Perm	0.42			c0.58			0.11		0.07	0.12		0.02
v/c Ratio	0.86	0.90		1.18	0.19		0.27	0.60	0.17	0.30	0.66	0.05
Uniform Delay, d1	14.5	15.0		16.5	9.3		13.1	15.4	12.6	13.3	15.9	11.9
Progression Factor	1.00	1.00		1.00	1.00		0.56	0.55	0.55	0.75	0.79	0.51
Incremental Delay, d2	20.2	6.1		142.1	0.2		1.7	2.4	0.4	1.5	2.8	0.1
Delay (s)	34.7	21.1		158.6	9.4		9.0	10.9	7.3	11.6	15.4	6.2
Level of Service	C	C		F	A		A	B	A	B	B	A
Approach Delay (s)		23.0			41.7			10.0			13.8	
Approach LOS		C			D			B			B	

Intersection Summary				
HCM Average Control Delay	22.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	85.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
29: Embarcadero & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	340	146	307	468	337	25	326	134	58	73	469	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.96	1.00		0.95	1.00		1.00	1.00		0.93	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1702	2724		1508	3308		1770	1564		3161	1525	
Flt Permitted	0.50	1.00		0.42	1.00		0.12	1.00		0.62	1.00	
Satd. Flow (perm)	887	2724		667	3308		233	1564		2077	1525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	159	334	509	366	27	354	146	63	79	510	349
RTOR Reduction (vph)	0	119	0	0	9	0	0	24	0	0	38	0
Lane Group Flow (vph)	370	374	0	509	384	0	354	185	0	79	821	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0		0	0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	341	1048		257	1272		115	770		1023	751	
v/s Ratio Prot		0.14			0.12			0.12			0.54	
v/s Ratio Perm	0.42			c0.76			c1.52			0.04		
v/c Ratio	1.09	0.36		1.98	0.30		3.08	0.24		0.08	1.09	
Uniform Delay, d1	20.0	14.3		20.0	13.9		16.5	9.5		8.7	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.13	1.16	
Incremental Delay, d2	73.4	0.9		455.0	0.6		957.9	0.7		0.1	55.3	
Delay (s)	93.4	15.2		475.0	14.5		974.4	10.2		9.9	74.5	
Level of Service	F	B		F	B		F	B		A	E	
Approach Delay (s)		48.7			274.4			616.4			69.1	
Approach LOS		D			F			F			E	

Intersection Summary				
HCM Average Control Delay	214.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	2.60			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	120.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	10	243	1369	62	180	584	53	63	196	333	61	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	1.00		1.00	0.98			1.00	0.98		0.91
Flpb, ped/bikes		0.96	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.97			1.00	0.98		0.85
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3297	3282		1770	3085			3433	1482		1365
Flt Permitted		0.29	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		991	3282		1770	3085			3433	1482		1365
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	264	1488	67	196	635	58	90	213	362	55	20
RTOR Reduction (vph)	0	0	3	0	0	9	0	0	0	0	0	13
Lane Group Flow (vph)	0	275	1552	0	196	774	0	0	213	419	0	5
Confl. Peds. (#/hr)		70		70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Prot				Prot			Perm
Protected Phases		5	2		1	6			7	4		
Permitted Phases	5											4
Actuated Green, G (s)		14.0	51.0		4.0	40.0			4.0	31.6		31.6
Effective Green, g (s)		14.0	51.0		4.0	40.0			4.0	31.6		31.6
Actuated g/C Ratio		0.13	0.47		0.04	0.37			0.04	0.29		0.29
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		128	1541		65	1136			126	431		397
v/s Ratio Prot			c0.47		c0.11	0.25			c0.06	c0.28		
v/s Ratio Perm		c0.28										0.00
v/c Ratio		2.15	1.01		3.02	0.68			1.69	0.97		0.01
Uniform Delay, d1		47.3	28.8		52.3	28.9			52.3	38.1		27.4
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		541.9	24.6		946.6	3.3			342.4	35.8		0.0
Delay (s)		589.2	53.4		998.9	32.2			394.7	73.8		27.4
Level of Service		F	D		F	C			F	E		C
Approach Delay (s)			133.9			225.8				177.7		
Approach LOS			F			F				F		

Intersection Summary				
HCM Average Control Delay	155.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	97.8%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	42	19	137	188
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1437
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	21	149	204
RTOR Reduction (vph)	0	0	0	63
Lane Group Flow (vph)	0	67	149	141
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	3	3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	31.6	31.6
Effective Green, g (s)		4.0	31.6	31.6
Actuated g/C Ratio		0.04	0.29	0.29
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		65	542	418
v/s Ratio Prot		0.04	0.08	
v/s Ratio Perm				0.10
v/c Ratio		1.03	0.27	0.34
Uniform Delay, d1		52.3	29.7	30.3
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		120.5	0.1	0.2
Delay (s)		172.8	29.8	30.4
Level of Service		F	C	C
Approach Delay (s)			52.9	
Approach LOS			D	

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Measure DD
31: Grand Av & Harrison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	383	723	163	269	519	52	0	1428	793	0	575	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3321		3400	3432			5036	1475		4520	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3321		3400	3432			5036	1475		4520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	416	786	177	292	564	57	0	1535	853	0	625	237
RTOR Reduction (vph)	0	21	0	0	6	0	0	0	386	0	72	0
Lane Group Flow (vph)	416	942	0	292	615	0	0	1535	467	0	790	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Effective Green, g (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.15	0.31		0.26	0.43			0.28	0.28		0.28	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	514	1016		878	1459			1391	408		1249	
v/s Ratio Prot	0.12	c0.28		0.09	c0.18			0.30			0.17	
v/s Ratio Perm									c0.32			
v/c Ratio	0.81	0.93		0.33	0.42			1.10	1.15		0.63	
Uniform Delay, d1	38.7	31.6		28.3	18.9			34.0	34.0		29.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.6	13.7		0.1	0.9			57.7	90.5		0.8	
Delay (s)	47.3	45.3		28.4	19.8			91.8	124.5		30.6	
Level of Service	D	D		C	B			F	F		C	
Approach Delay (s)		45.9			22.6			103.5			30.6	
Approach LOS		D			C			F			C	

Intersection Summary				
HCM Average Control Delay	64.5	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	112.6%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
32: 20th St #3 & Lakeside Dr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1009	170	583	512	121	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.98		1.00	1.00	0.91	0.89
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.86	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4724		3367	4893	2854	1278
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4724		3367	4893	2854	1278
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1097	185	634	557	132	1040
RTOR Reduction (vph)	34	0	0	0	329	329
Lane Group Flow (vph)	1248	0	634	557	323	191
Confl. Peds. (#/hr)		70	70		70	70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	23.0		16.0	43.0	19.0	19.0
Effective Green, g (s)	23.0		16.0	43.0	19.0	19.0
Actuated g/C Ratio	0.33		0.23	0.61	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1552		770	3006	776	347
v/s Ratio Prot	c0.26		c0.19	0.11	0.11	
v/s Ratio Perm						c0.15
v/c Ratio	0.80		0.82	0.19	0.42	0.55
Uniform Delay, d1	21.4		25.7	5.9	21.0	21.9
Progression Factor	1.18		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7		9.7	0.1	1.7	6.2
Delay (s)	28.9		35.4	6.0	22.6	28.0
Level of Service	C		D	A	C	C
Approach Delay (s)	28.9			21.6	25.0	
Approach LOS	C			C	C	

Intersection Summary				
HCM Average Control Delay	25.3	HCM Level of Service		C
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization	75.1%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
33: 20th St #3 & Driveway — 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	413	41	149	370	114	270	75	0	743	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00	0.84			0.97	0.92	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.85			0.94	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4795		1770	3406	1337			1568	1425	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4795		1770	3406	1337			1568	1425	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	45	162	402	124	293	82	0	808	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	32	299	0	0
Lane Group Flow (vph)	494	0	162	402	124	0	0	577	275	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		11.0	23.0	23.0			30.0	30.0	5.0	70.0
Effective Green, g (s)	17.0		11.0	23.0	23.0			30.0	30.0	5.0	70.0
Actuated g/C Ratio	0.24		0.16	0.33	0.33			0.43	0.43	0.07	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	1165		278	1119	439			672	611	115	1611
v/s Ratio Prot	c0.10		c0.09	0.12				c0.37		0.02	
v/s Ratio Perm					0.09				0.19		0.01
v/c Ratio	0.42		0.58	0.36	0.28			0.86	0.45	0.29	0.01
Uniform Delay, d1	22.4		27.4	17.9	17.4			18.1	14.2	30.8	0.0
Progression Factor	1.00		0.84	0.75	0.75			1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1		8.5	0.9	1.6			13.4	2.4	6.2	0.0
Delay (s)	23.5		31.6	14.4	14.6			31.5	16.6	37.0	0.0
Level of Service	C		C	B	B			C	B	D	A
Approach Delay (s)	23.5			18.5				24.3			
Approach LOS	C			B				C			

Intersection Summary				
HCM Average Control Delay	22.5	HCM Level of Service		C
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)		12.0
Intersection Capacity Utilization	73.0%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
34: Jackson St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	32	14	712	630	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1502			1628	1555	
Flt Permitted	0.96			0.98	1.00	
Satd. Flow (perm)	1502			1603	1555	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	266	35	15	774	663	173
RTOR Reduction (vph)	9	0	0	0	17	0
Lane Group Flow (vph)	292	0	0	789	819	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type		custom				
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	14.0			34.0	34.0	
Effective Green, g (s)	14.0			34.0	34.0	
Actuated g/C Ratio	0.25			0.62	0.62	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	382			991	961	
v/s Ratio Prot	c0.19				c0.53	
v/s Ratio Perm				0.49		
v/c Ratio	0.76			0.80	0.85	
Uniform Delay, d1	19.0			7.9	8.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	13.6			6.6	9.4	
Delay (s)	32.5			14.5	17.9	
Level of Service	C			B	B	
Approach Delay (s)	32.5			14.5	17.9	
Approach LOS	C			B	B	

Intersection Summary				
HCM Average Control Delay	18.8	HCM Level of Service		B
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	55.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	71.0%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
35: Lakeside Dr & 19th St — 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	601	15	0	0	0	0	137	723	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3318	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	653	16	0	0	0	0	146	769	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	669	0	0	0	0	0	146	769	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		585						1585	1428		
v/s Ratio Prot		c0.43						0.04			
v/s Ratio Perm									c0.50		
v/c Ratio		1.14						0.09	0.54		
Uniform Delay, d1		14.0						6.4	0.3		
Progression Factor		1.00						1.00	1.00		
Incremental Delay, d2		83.6						0.1	1.5		
Delay (s)		97.6						6.5	1.7		
Level of Service		F						A	A		
Approach Delay (s)	97.6				0.0			2.5		0.0	
Approach LOS	F				A			A		A	

Intersection Summary				
HCM Average Control Delay	42.6	HCM Level of Service		D
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	48.6%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
36: 17th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	66	532	0	0	0	0	0	0	49	695	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.87									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2698									4813	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2698									4813	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	578	0	0	0	0	0	0	53	755	0
RTOR Reduction (vph)	0	93	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	557	0	0	0	0	0	0	0	0	791	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			8									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		16.3									22.2	
Effective Green, g (s)		16.3									22.2	
Actuated g/C Ratio		0.36									0.49	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		977									2374	
v/s Ratio Prot		c0.21										
v/s Ratio Perm											0.16	
v/c Ratio		1.02dr									0.33	
Uniform Delay, d1		11.5									6.9	
Progression Factor		1.00									2.35	
Incremental Delay, d2		2.4									0.1	
Delay (s)		13.9									16.4	
Level of Service		B									B	
Approach Delay (s)		13.9			0.0			0.0			16.4	
Approach LOS		B			A			A			B	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	55.2%	ICU Level of Service	B	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
38: 14th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑					↰	↑↑↑	
Volume (vph)	0	640	64	47	459	0	0	0	0	684	505	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.97	
Frt		0.99			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	0.98	
Satd. Flow (prot)		3133			3238					1295	3011	
Flt Permitted		1.00			0.86					0.95	0.98	
Satd. Flow (perm)		3133			2800					1295	3011	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	696	70	51	499	0	0	0	0	743	549	38
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	749	0	0	550	0	0	0	0	438	885	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1462			1307					489	1137	
v/s Ratio Prot		c0.24										
v/s Ratio Perm					0.20					c0.34	0.29	
v/c Ratio		0.51			0.42					0.90	0.78	
Uniform Delay, d1		8.4			8.0					13.2	12.3	
Progression Factor		1.00			1.00					1.47	1.49	
Incremental Delay, d2		1.3			1.0					20.1	4.8	
Delay (s)		9.7			9.0					39.4	23.1	
Level of Service		A			A					D	C	
Approach Delay (s)		9.7			9.0			0.0			28.5	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	19.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	67.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
39: 14th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↱		↑↑↑				
Volume (vph)	89	1264	0	0	335	343	129	445	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.90		1.00				
Flpb, ped/bikes		1.00			1.00	1.00		0.98				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		1.00			1.00	1.00		0.99				
Satd. Flow (prot)		3160			3471	1424		4652				
Flt Permitted		0.89			1.00	1.00		0.99				
Satd. Flow (perm)		2850			3471	1424		4652				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	1374	0	0	364	373	140	484	24	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	33	0	7	0	0	0	0
Lane Group Flow (vph)	0	1471	0	0	364	340	0	641	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		38.7			38.7	38.7		13.6				
Effective Green, g (s)		38.7			38.7	38.7		13.6				
Actuated g/C Ratio		0.64			0.64	0.64		0.22				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1814			2209	906		1041				
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.52				0.24		0.14				
v/c Ratio		0.81			0.16	0.38		0.62				
Uniform Delay, d1		8.3			4.5	5.3		21.2				
Progression Factor		1.00			1.00	1.00		1.00				
Incremental Delay, d2		4.1			0.2	1.2		0.8				
Delay (s)		12.4			4.6	6.5		22.0				
Level of Service		B			A	A		C				
Approach Delay (s)		12.4			5.6			22.0			0.0	
Approach LOS		B			A			C			A	

Intersection Summary				
HCM Average Control Delay	12.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	94.3%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
40: 13th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑									↑↑↑	
Volume (vph)	0	672	177	0	0	0	0	0	0	105	679	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5884									4758	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5884									4758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	730	192	0	0	0	0	0	0	114	738	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	879	0	0	0	0	0	0	0	0	806	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2746									1797	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.17	
v/c Ratio		0.32									0.45	
Uniform Delay, d1		7.5									10.5	
Progression Factor		1.00									1.38	
Incremental Delay, d2		0.3									0.7	
Delay (s)		7.8									15.2	
Level of Service		A									B	
Approach Delay (s)		7.8			0.0			0.0			15.2	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	11.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	44.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
41: 13th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	666	0	0	0	0	0	534	331	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.93			
Flpb, ped/bikes	0.97	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1508	4873						4831	1474			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1508	4873						4831	1474			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	724	0	0	0	0	0	580	360	0	0	0
RTOR Reduction (vph)	48	0	0	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	36	724	0	0	0	0	0	580	291	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	653	2112						2040	622			
v/s Ratio Prot		c0.15						0.12				
v/s Ratio Perm	0.02								c0.20			
v/c Ratio	0.06	0.34						0.28	0.47			
Uniform Delay, d1	7.4	8.5						8.5	9.4			
Progression Factor	0.93	0.83						2.30	2.81			
Incremental Delay, d2	0.2	0.4						0.3	2.0			
Delay (s)	7.0	7.5						19.9	28.3			
Level of Service	A	A						B	C			
Approach Delay (s)		7.4			0.0			23.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	15.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
42: 12th St #2 & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	256	804	0	0	0	0	0	602	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5900						4734	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5900						4734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	278	874	0	0	0	0	0	654	62
RTOR Reduction (vph)	0	0	0	0	59	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1093	0	0	0	0	0	691	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1788	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.19							
v/c Ratio					0.40						0.39	
Uniform Delay, d1					7.9						10.2	
Progression Factor					0.52						1.70	
Incremental Delay, d2					0.4						0.6	
Delay (s)					4.5						17.9	
Level of Service					A						B	
Approach Delay (s)		0.0			4.5			0.0			17.9	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
43: 12th St #2 & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	961	25	436	864	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					1.00			1.00				
Flt Protected					1.00			0.98				
Satd. Flow (prot)					4674			5906				
Flt Permitted					1.00			0.98				
Satd. Flow (perm)					4674			5906				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1045	27	469	929	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1066	0	0	1374	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1973			2297				
v/s Ratio Prot					c0.23							
v/s Ratio Perm								c0.23				
v/c Ratio					0.54			0.60				
Uniform Delay, d1					9.7			11.0				
Progression Factor					1.00			1.57				
Incremental Delay, d2					1.1			1.1				
Delay (s)					10.8			18.3				
Level of Service					B			B				
Approach Delay (s)		0.0			10.8			18.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	50.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
44: 11th St & Madison St — 5/23/2007

Movement	SBL	SBT	SBR	SET	SER
Lane Configurations					
Volume (vph)	57	648	46	1296	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.98	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4797	1548	4597	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4797	1548	4597	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	922	50	1409	164
RTOR Reduction (vph)	0	0	0	25	0
Lane Group Flow (vph)	0	984	50	1548	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1839	
v/s Ratio Prot			0.03	c0.34	
v/s Ratio Perm		0.21			
v/c Ratio		0.54	0.08	0.84	
Uniform Delay, d1		11.0	8.4	12.2	
Progression Factor		0.98	1.00	1.00	
Incremental Delay, d2		1.1	0.3	4.9	
Delay (s)		11.9	8.6	17.1	
Level of Service		B	A	B	
Approach Delay (s)		11.9		16.8	
Approach LOS		B		B	

Intersection Summary				
HCM Average Control Delay	15.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↱	
Volume (vph)	0	0	0	162	367	0	0	0	0	94	678	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	176	399	0	0	0	0	102	954	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	575	0	0	0	0	0	1107	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.18						0.23	
v/c Ratio					0.51						0.46	
Uniform Delay, d1					11.4						7.0	
Progression Factor					0.97						0.28	
Incremental Delay, d2					1.1						0.5	
Delay (s)					12.1						2.5	
Level of Service					B						A	
Approach Delay (s)		0.0			12.1			0.0			2.5	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	5.7	HCM Level of Service		A
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↱			↰↑↑↱				
Volume (vph)	2	66	0	0	352	110	192	857	81	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3311			1546			5960				
Flt Permitted		0.94			1.00			0.99				
Satd. Flow (perm)		3132			1546			5980				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	72	0	0	383	120	209	932	88	0	0	0
RTOR Reduction (vph)	0	0	0	0	25	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	74	0	0	478	0	0	1203	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1044			515			2924				
v/s Ratio Prot					c0.31							
v/s Ratio Perm		0.02						0.20				
v/c Ratio		0.07			0.93			0.41				
Uniform Delay, d1		10.2			14.5			7.4				
Progression Factor		1.86			1.00			0.90				
Incremental Delay, d2		0.1			25.2			0.4				
Delay (s)		19.2			39.7			7.0				
Level of Service		B			D			A				
Approach Delay (s)		19.2			39.7			7.0			0.0	
Approach LOS		B			D			A			A	

Intersection Summary				
HCM Average Control Delay	16.6	HCM Level of Service		B
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	154	472	0	0	0	0	0	995	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6010						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6010						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	167	513	0	0	0	0	0	1082	128
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	650	0	0	0	0	0	1177	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2270						2204	
v/s Ratio Prot											c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.53	
Uniform Delay, d1					9.8						8.5	
Progression Factor					1.12						0.90	
Incremental Delay, d2					0.3						0.9	
Delay (s)					11.2						8.5	
Level of Service					B						A	
Approach Delay (s)		0.0			11.2			0.0			8.5	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.5	HCM Level of Service		A
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	38.2%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	420	112	194	903	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.98			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5883			6060				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5883			6060				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	457	122	211	982	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	86	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	550	0	0	1107	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2353			2559				
v/s Ratio Prot					c0.09							
v/s Ratio Perm								0.18				
v/c Ratio					0.23			0.43				
Uniform Delay, d1					8.9			9.2				
Progression Factor					1.00			1.08				
Incremental Delay, d2					0.2			0.0				
Delay (s)					9.2			10.2				
Level of Service					A			B				
Approach Delay (s)		0.0			9.2			10.2			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
50: 7th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑↑	
Volume (vph)	0	1576	481	0	0	0	0	0	0	312	957	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5860									4711	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5860									4711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1713	523	0	0	0	0	0	0	339	1040	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	2218	0	0	0	0	0	0	0	0	1376	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2604									1884	
v/s Ratio Prot		c0.38										
v/s Ratio Perm											0.29	
v/c Ratio		0.85									0.73	
Uniform Delay, d1		11.2									11.4	
Progression Factor		1.00									1.92	
Incremental Delay, d2		3.8									2.3	
Delay (s)		14.9									24.2	
Level of Service		B									C	
Approach Delay (s)		14.9			0.0			0.0			24.2	
Approach LOS		B			A			A			C	

Intersection Summary				
HCM Average Control Delay	18.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	63.5%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
51: 7th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑						↑↑↑↱				
Volume (vph)	204	1498	0	0	0	0	0	900	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.96				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.91				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6092						4239				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6092						4239				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1628	0	0	0	0	0	978	1288	0	0	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1825	0	0	0	0	0	2264	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2437						1696				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.30										
v/c Ratio		0.75						2.44dr				
Uniform Delay, d1		11.6						13.5				
Progression Factor		1.49						1.00				
Incremental Delay, d2		1.1						154.7				
Delay (s)		18.3						168.2				
Level of Service		B						F				
Approach Delay (s)		18.3			0.0			168.2			0.0	
Approach LOS		B			A			F			A	

Intersection Summary				
HCM Average Control Delay	100.9	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	79.2%	ICU Level of Service	D	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
52: Lakeshore & 1st Ave #2 — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↰↑↑	↑↑↑	↱
Volume (vph)	10	10	10	1334	1209	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.95			1.00	1.00	0.82
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1603			3405	3406	1294
Flt Permitted	0.98			0.94	1.00	1.00
Satd. Flow (perm)	1603			3218	3406	1294
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	1450	1314	11
RTOR Reduction (vph)	10	0	0	0	0	3
Lane Group Flow (vph)	12	0	0	1461	1314	8
Confl. Peds. (#/hr)	70		70			70
Confl. Bikes (#/hr)			16			16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	4.5			37.5	37.5	37.5
Effective Green, g (s)	4.5			37.5	37.5	37.5
Actuated g/C Ratio	0.09			0.75	0.75	0.75
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	144			2414	2555	971
v/s Ratio Prot	c0.01				0.39	
v/s Ratio Perm				c0.45		0.01
v/c Ratio	0.08			0.61	0.51	0.01
Uniform Delay, d1	20.9			2.9	2.5	1.6
Progression Factor	1.00			0.27	0.79	1.12
Incremental Delay, d2	0.1			0.2	0.7	0.0
Delay (s)	20.9			1.0	2.7	1.8
Level of Service	C			A	A	A
Approach Delay (s)	20.9			1.0	2.7	
Approach LOS	C			A	A	

Intersection Summary				
HCM Average Control Delay	1.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	63.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
53: 12th St #1#2 & Convention Ctr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱			↑↑↑		↱
Volume (vph)	3376	10	0	1444	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	1.00			1.00		0.87
Flpb, ped/bikes	1.00			1.00		1.00
Frt	1.00			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4890			4893		1409
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4890			4893		1409
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3670	11	0	1570	0	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	3681	0	0	1570	0	11
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	38.8			38.8		3.2
Effective Green, g (s)	38.8			38.8		3.2
Actuated g/C Ratio	0.78			0.78		0.06
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3795			3797		90
v/s Ratio Prot	c0.75			0.32		
v/s Ratio Perm						c0.01
v/c Ratio	0.97			0.41		0.12
Uniform Delay, d1	5.1			1.8		22.1
Progression Factor	0.82			1.00		1.00
Incremental Delay, d2	1.3			0.3		0.2
Delay (s)	5.4			2.2		22.3
Level of Service	A			A		C
Approach Delay (s)	5.4			2.2	22.3	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	4.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	84.7%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1253	824	620	2133	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1362	896	674	2318	0
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	0	1360	896	674	2318	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		18.0	18.0	50.0	24.0	
Effective Green, g (s)		18.0	18.0	50.0	24.0	
Actuated g/C Ratio		0.36	0.36	1.00	0.48	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1251	1212	3254	2394	
v/s Ratio Prot		c0.39	0.27	0.21	c0.46	
v/s Ratio Perm						
v/c Ratio		1.09	0.74	0.21	0.97	
Uniform Delay, d1		16.0	14.0	0.0	12.6	
Progression Factor		1.00	0.82	1.00	0.86	
Incremental Delay, d2		52.6	2.0	0.1	7.6	
Delay (s)		68.6	13.4	0.1	18.4	
Level of Service		E	B	A	B	
Approach Delay (s)	68.6			7.7	18.4	
Approach LOS	E			A	B	

Intersection Summary			
HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	647	0	678	1286	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.86		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		3090		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		3090		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	921	0	737	1398	0
RTOR Reduction (vph)	0	45	0	0	0	0
Lane Group Flow (vph)	0	876	0	737	1398	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		15.6		26.4	26.4	
Effective Green, g (s)		15.6		26.4	26.4	
Actuated g/C Ratio		0.31		0.53	0.53	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		964		1833	1718	
v/s Ratio Prot				0.21	c0.43	
v/s Ratio Perm		c0.28				
v/c Ratio		0.91		0.40	0.81	
Uniform Delay, d1		16.5		7.1	9.8	
Progression Factor		1.00		1.13	1.00	
Incremental Delay, d2		11.9		0.7	4.4	
Delay (s)		28.4		8.6	14.1	
Level of Service		C		A	B	
Approach Delay (s)	28.4			8.6	14.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	443	349	0	0	0	0	483	197	374	1105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.97						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4345						3539	1329	1610	3173	
Flt Permitted		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4345						3539	1329	1610	3173	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	457	360	0	0	0	0	525	214	407	1201	0
RTOR Reduction (vph)	0	69	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1177	0	0	0	0	0	525	214	366	1242	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.5						18.5	106.0	44.0	44.0	
Effective Green, g (s)		30.5						18.5	106.0	44.0	44.0	
Actuated g/C Ratio		0.29						0.17	1.00	0.42	0.42	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1250						618	1329	668	1317	
v/s Ratio Prot								c0.15		0.23	c0.39	
v/s Ratio Perm		0.27							0.16			
v/c Ratio		0.94						0.85	0.16	0.55	0.94	
Uniform Delay, d1		36.9						42.4	0.0	23.5	29.8	
Progression Factor		1.00						1.00	1.00	0.75	0.77	
Incremental Delay, d2		14.8						13.7	0.3	1.3	7.3	
Delay (s)		51.7						56.1	0.3	19.0	30.3	
Level of Service		D						E	A	B	C	
Approach Delay (s)		51.7			0.0			39.9			27.7	
Approach LOS		D			A			D			C	

Intersection Summary				
HCM Average Control Delay	38.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	92	443	1102	165	307	258	0	0	584	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.90		1.00	1.00	0.97	1.00	1.00			0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1199		1770	3539	1338	3433	1863			2874	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1199		1770	3539	1338	3433	1863			2874	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	100	461	1148	172	334	280	0	0	621	536
RTOR Reduction (vph)	0	94	0	0	0	90	0	0	0	0	100	0
Lane Group Flow (vph)	97	17	0	461	1148	82	334	280	0	0	1057	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0		24.7	24.7	24.7	8.0	38.8			26.8	
Effective Green, g (s)	5.0	5.0		24.7	24.7	24.7	8.0	38.8			26.8	
Actuated g/C Ratio	0.06	0.06		0.31	0.31	0.31	0.10	0.48			0.34	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	105	75		546	1093	413	343	904			963	
v/s Ratio Prot	c0.06	0.01		0.26	c0.32		c0.10	0.15			c0.37	
v/s Ratio Perm						0.06						
v/c Ratio	0.92	0.23		0.84	1.05	0.20	0.97	0.31			1.10	
Uniform Delay, d1	37.3	35.7		25.9	27.6	20.4	35.9	12.5			26.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	62.8	0.6		14.8	41.4	1.1	41.1	0.1			59.3	
Delay (s)	100.1	36.2		40.6	69.1	21.4	77.0	12.6			85.9	
Level of Service	F	D		D	E	C	E	B			F	
Approach Delay (s)		66.0			57.1			47.6			85.9	
Approach LOS		E			E			D			F	

Intersection Summary				
HCM Average Control Delay	64.9	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	96.5%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
47: E. 10th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	61	0	0	654	150	114	773	103	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.99			0.99				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3298			1565			5941				
Flt Permitted		0.83			1.00			0.99				
Satd. Flow (perm)		2765			1565			5941				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	66	0	0	711	163	124	840	112	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	76	0	0	864	0	0	1031	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		22.0			22.0			15.0				
Effective Green, g (s)		22.0			22.0			15.0				
Actuated g/C Ratio		0.49			0.49			0.33				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1352			765			1980				
v/s Ratio Prot					c0.55							
v/s Ratio Perm		0.03						0.17				
v/c Ratio		0.06			1.13			0.52				
Uniform Delay, d1		6.0			11.5			12.1				
Progression Factor		0.28			1.00			1.86				
Incremental Delay, d2		0.1			74.2			0.8				
Delay (s)		1.8			85.7			23.4				
Level of Service		A			F			C				
Approach Delay (s)		1.8			85.7			23.4			0.0	
Approach LOS		A			F			C			A	

Intersection Summary				
HCM Average Control Delay	49.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	11	293	518	555	524	271	473	197	154	680	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.96			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1618	1444	1736	3539	1291	1610	2960			3489	1296
Flt Permitted		0.48	1.00	0.65	1.00	1.00	0.95	0.85			0.68	1.00
Satd. Flow (perm)		801	1444	1192	3539	1291	1610	2507			2391	1296
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	12	318	563	603	570	291	509	212	166	731	344
RTOR Reduction (vph)	0	11	166	0	0	123	0	43	0	0	0	80
Lane Group Flow (vph)	0	135	120	563	603	447	282	707	0	0	897	264
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		37.7	37.7	37.7	37.7	37.7	13.0	43.3			26.3	26.3
Effective Green, g (s)		37.7	37.7	37.7	37.7	37.7	13.0	43.3			26.3	26.3
Actuated g/C Ratio		0.42	0.42	0.42	0.42	0.42	0.14	0.48			0.29	0.29
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		336	605	499	1482	541	233	1272			699	379
v/s Ratio Prot					0.17		c0.16	0.08				
v/s Ratio Perm		0.17	0.08	c0.47		0.35		0.19			c0.38	0.20
v/c Ratio		0.40	0.20	1.13	0.41	0.83	1.12	0.56			1.28	0.70
Uniform Delay, d1		18.3	16.6	26.2	18.3	23.2	38.5	16.5			31.8	28.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.27	1.92			1.00	1.00
Incremental Delay, d2		3.5	0.7	80.5	0.8	13.5	86.0	1.2			138.2	10.2
Delay (s)		21.8	17.3	106.6	19.1	36.8	135.0	33.0			170.1	38.5
Level of Service		C	B	F	B	D	F	C			F	D
Approach Delay (s)		18.8			53.3			59.4			133.6	
Approach LOS		B			D			E			F	

Intersection Summary				
HCM Average Control Delay	73.9	HCM Level of Service		E
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		13.0
Intersection Capacity Utilization	108.6%	ICU Level of Service		G
Analysis Period (min)	15			

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HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	1108	346	0	0	0	0	519	637	712	844	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.98						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.97						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	0.99	
Satd. Flow (prot)		4607						3539	1296	1610	3147	
Flt Permitted		0.99						1.00	1.00	0.95	0.99	
Satd. Flow (perm)		4607						3539	1296	1610	3147	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	296	1204	376	0	0	0	0	546	671	774	917	0
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1828	0	0	0	0	0	546	671	550	1141	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm									Free	Split	
Protected Phases		4						2			1	1
Permitted Phases	4									Free		
Actuated Green, G (s)		31.5						18.5	90.0	27.0	27.0	
Effective Green, g (s)		31.5						18.5	90.0	27.0	27.0	
Actuated g/C Ratio		0.35						0.21	1.00	0.30	0.30	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1612						727	1296	483	944	
v/s Ratio Prot								c0.15		0.34	c0.36	
v/s Ratio Perm		0.40							0.52			
v/c Ratio		1.13						0.75	0.52	1.14	1.21	
Uniform Delay, d1		29.2						33.6	0.0	31.5	31.5	
Progression Factor		1.00						0.93	1.00	0.86	0.87	
Incremental Delay, d2		68.6						0.7	0.1	65.1	94.9	
Delay (s)		97.8						31.8	0.1	92.2	122.2	
Level of Service		F						C	A	F	F	
Approach Delay (s)		97.8			0.0			14.3			112.4	
Approach LOS		F			A			B			F	

Intersection Summary				
HCM Average Control Delay	81.7	HCM Level of Service		F
HCM Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		13.0
Intersection Capacity Utilization	90.3%	ICU Level of Service		E
Analysis Period (min)	15			

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HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	0	368	243	1230	270	215	441	0	0	260	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.70		1.00	1.00	0.91	1.00	1.00			0.86	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	921		1770	3539	1260	3433	1863			2666	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	921		1770	3539	1260	3433	1863			2666	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	115	0	400	261	1323	290	234	479	0	0	283	230
RTOR Reduction (vph)	0	370	0	0	0	91	0	0	0	0	132	0
Lane Group Flow (vph)	103	42	0	261	1323	199	234	479	0	0	381	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	7.0	7.0		43.2	43.2	43.2	10.8	31.7			16.9	
Effective Green, g (s)	7.0	7.0		43.2	43.2	43.2	10.8	31.7			16.9	
Actuated g/C Ratio	0.07	0.07		0.46	0.46	0.46	0.12	0.34			0.18	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	126	69		819	1637	583	397	632			482	
v/s Ratio Prot	c0.06	0.05		0.15	c0.37		0.07	c0.26			0.14	
v/s Ratio Perm						0.16						
v/c Ratio	0.82	0.61		0.32	0.81	0.34	0.59	0.76			0.79	
Uniform Delay, d1	42.6	41.9		15.8	21.5	16.0	39.2	27.4			36.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	30.7	10.0		1.0	4.4	1.6	1.4	4.6			8.1	
Delay (s)	73.2	51.8		16.8	26.0	17.6	40.6	32.1			44.6	
Level of Service	E	D		B	C	B	D	C			D	
Approach Delay (s)		56.1			23.4			34.9			44.6	
Approach LOS		E			C			C			D	

Intersection Summary				
HCM Average Control Delay	33.3	HCM Level of Service		C
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	93.4	Sum of lost time (s)		11.5
Intersection Capacity Utilization	90.7%	ICU Level of Service		E
Analysis Period (min)	15			

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HCM Signalized Intersection Capacity Analysis — Measure DD
51: 7th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	204	1498	0	0	0	0	0	900	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.96				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.91				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6084						4242				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6084						4242				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1628	0	0	0	0	0	978	1288	0	0	0
RTOR Reduction (vph)	0	45	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	1805	0	0	0	0	0	2265	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		15.0						21.0				
Effective Green, g (s)		15.0						21.0				
Actuated g/C Ratio		0.33						0.47				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2028						1980				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.30										
v/c Ratio		0.89						2.10dr				
Uniform Delay, d1		14.2						12.0				
Progression Factor		0.48						1.00				
Incremental Delay, d2		3.5						71.4				
Delay (s)		10.3						83.4				
Level of Service		B						F				
Approach Delay (s)		10.3			0.0			83.4			0.0	
Approach LOS		B			A			F			A	

Intersection Summary				
HCM Average Control Delay	50.6	HCM Level of Service		D
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		9.0
Intersection Capacity Utilization	79.2%	ICU Level of Service		D
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

No El Embarcadero Analysis

TRAFFIC ANALYSIS FOR CLOSURE OF EL EMBARCADERO

During the project design process, two project development scenarios were studied: the project as defined in the Project Description; and a "No El Embarcadero" scenario, where El Embarcadero would be closed entirely between Grand Avenue and Lakeshore Avenue. Because the preliminary traffic analysis for the No El Embarcadero scenario identified five significant and unavoidable impacts to nearby intersections, closure of El Embarcadero was dropped from further consideration. Impacts associated with the Existing Plus Project with No El Embarcadero variant are discussed below. Table E-1 shows the intersection LOS for key intersections for the No El Embarcadero variant.

Impact TRANS-E1 (El Embarcadero Closure): Under the Existing Conditions Plus Project with No El Embarcadero the Santa Clara Avenue/Grand Avenue intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-E1: Optimization of the signal timing as described in Mitigation Measure TRANS-1 would improve the intersection to LOS D during the PM peak hour. (LTS)

Impact TRANS-E2 (El Embarcadero Closure): Under the Existing Conditions Plus Project with No El Embarcadero the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-E2: Implementation of Mitigation Measure TRANS-8 would improve traffic operations to LOS D during the PM peak hour. (LTS)

Impact TRANS-E3 (El Embarcadero Closure): The Existing Conditions plus Project with No El Embarcadero would cause total intersection average vehicle delay at the Lake Park Avenue/Lakeshore Avenue intersection to increase by 148.2 seconds during the AM peak hour and would cause the intersection to degrade to LOS E during the PM peak hour. (S)

Mitigation Measure TRANS-E3: Implementation of Mitigation Measure TRANS-2 would improve the intersection to LOS D during the PM peak hour, but would leave the intersection operating at LOS F, with an average vehicle delay of 83.2 seconds, during the AM peak hour. After mitigation the average vehicle delay would be 6.0 seconds higher than no project and no mitigation. To achieve a less-than-significant level of impact would require providing an additional lane at the intersection. A southbound lane could be added on Lakeshore Avenue by removing parking along the west side of the street; however, this additional mitigation would not be feasible due to the impacts on parking considered to be essential to local businesses along the west side of Lakeshore Avenue. (SU)

Table E- 1: Intersection Levels of Service – Existing Plus Project Conditions

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing Conditions LOS[1]	Existing Conditions Delay[2]	Existing Conditions Plus Project LOS[1]	Existing Conditions Plus Project Delay[2]	Existing Conditions Plus Project With No El Embarcadero LOS[1]	Existing Conditions Plus Project With No El Embarcadero Delay[2]
1. Santa Clara Ave/Grand Ave	Signal	Signal	AM	E	61.6	D	45.1	D	52.9
			PM	D	46.4	E	66.0	F	103.1
2. MacArthur Blvd/Grand Ave	Signal	Signal	AM	C	26.0	C	24.5	D	36.8
			PM	C	29.2	C	32.7	F	89.0
3. El Embarcadero (WB)/Grand Ave	Signal	Signal	AM	B	14.1	C	23.4	(Intersection Eliminated)	
			PM	A	9.1	C	30.2		
4. El Embarcadero (EB)/Grand Ave	Signal		AM	A	4.7	(Intersection Eliminated)		(Intersection Eliminated)	
			PM	C	21.7				
5. Lake Park Ave/Lakeshore Ave	Signal	Signal	AM	E	77.2	F	115.8	F	225.4
			PM	D	35.2	C	31.9	E	59.7
6. MacArthur Blvd/Lakeshore Ave	Signal	Signal	AM	D	36.0	C	34.0	D	43.6
			PM	F	89.3	F	103.1	F	184.1
7. El Embarcadero (WB)/Lakeshore Ave	Minor Stop	Signal	AM	N/A[3]		B	13.6	(Intersection Eliminated)	
			PM			B	14.7		
8. El Embarcadero (EB)/Lakeshore Ave	Minor Stop		AM	E	38.2	(Intersection Eliminated)		(Intersection Eliminated)	
			PM	F	180.2				
9. Boden Way/Lakeshore Ave	Minor Stop	Minor Stop	AM	C	23.0	C	19.5	C	24.1
			PM	B	13.9	C	15.7	C	16.2
			PM	B	17.0	B	15.8	B	15.8
			PM	E	39.0	E	39.0	E	39.0
30. 27th St/Bay Pl/Harrison St	Signal	Signal	AM	F	146.3	F	150.9	F	150.9
			PM	C	31.8	C	31.8	C	31.8
			PM			A	8.4	A	8.4

Notes:
Shaded values indicate a potential significant impact.
[1] LOS = Level of Service
[2] Average control delay in seconds per vehicle
[3] HCM LOS is not applicable for the stop-controlled approaches of this intersection.
[4] Defined as a downtown intersection
[5] The worst approach control delays and LOS are reported for side street stop-controlled intersections.
Source: Dowling Associates, 2007.

Impact TRANS-E4 (El Embarcadero Closure): The Existing Conditions Plus Project with No El Embarcadero would cause the MacArthur Boulevard/Lakeshore Avenue total intersection average vehicle delay to increase by 94.8 seconds during the PM peak hour. (S)

Mitigation Measure TRANS-E4: Implementation of Mitigation Measure TRANS-3 would reduce the total intersection average vehicle delay by 110 seconds during the PM peak hour.

However, the intersection would remain at LOS F. After mitigation, the intersection would operate at a total average vehicle delay that would be 16.1 seconds lower than the delay with no project and no mitigation. (LTS)

Impact TRANS-E5 (El Embarcadero Closure): The Existing Conditions plus Project with the No El Embarcadero would cause the total intersection average vehicle delay to increase by 4.6 seconds at the 27th Street/Bay Place/Harrison Street intersection during the PM peak hour where the intersection is at LOS F without the project. (S)

Mitigation Measure TRANS-E5: Implementation of Mitigation Measure TRANS-4 would reduce the total average vehicle delay at the intersection. With signal optimization the delay would be 45.3 seconds less than with no project and no mitigation. (LTS)

Cumulative Conditions (2025) Plus Project with No El Embarcadero. The following section describes the impacts associated with the No El Embarcadero Variant under cumulative conditions. Table E-2 shows LOS and delay for key intersections under the Cumulative plus Project with No El Embarcadero Variant.

Impact TRANS-E6 (El Embarcadero Closure): Under the Cumulative Plus Project with No El Embarcadero, the total intersection average vehicle delay at the Santa Clara Avenue/Grand Avenue intersection would increase by 16.7 seconds during the AM peak hour where the intersection is LOS E without the project and the intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-E6: Optimization of the signal timing at the Santa Clara Avenue/Grand Avenue intersection as described in Mitigation Measure TRANS-1 would improve traffic operations. With signal optimization the intersection would be LOS E (71.8 seconds average delay) during the AM peak hour and LOS F (95.8 seconds average delay) during the PM peak hour for the Project with No El Embarcadero Variant. No other feasible mitigation measures were identified at this intersection. After mitigation, the cumulative impact would remain significant and unavoidable. (SU)

Impact TRANS-E7 (El Embarcadero Closure): Under the Cumulative Plus Project with No El Embarcadero, the MacArthur Boulevard/Grand Avenue intersection would degrade to LOS F during the PM peak hour. (S)

Mitigation Measure TRANS-E7: With the modifications at the MacArthur Boulevard/Grand Avenue intersection as described under Mitigation Measure TRANS-8 the delay would be reduced from 180.6 seconds to 117.8 for the Project with No El Embarcadero, but the interesection would remain at LOS F during the PM peak hour. No other feasible mitigation measures were identified at this intersection. After mitigation, the cumulative impact would remain significant and unavoidable. (SU)

Table E-2: Intersection Levels of Service – Cumulative (2025) Conditions

Intersection	Traffic Control		Peak Hour	Existing Conditions		Cumulative Plus Project		Cumulative Plus Project With No El Embarcadero	
	(Existing)	(Future)		LOS[1]	Delay[2]	LOS[1]	Delay[2]	LOS[1]	Delay[2]
1. Santa Clara Ave / Grand Ave	Signal	Signal	AM	E	61.6	E	63.3	E	78.3
			PM	D	46.4	F	80.0	F	144.7
2. MacArthur Blvd / Grand Ave	Signal	Signal	AM	C	26.0	C	27.4	D	40.8
			PM	C	29.2	F	120.2	F	189.6
3. El Embarcadero (WB) / Grand Ave	Signal	Signal	AM	B	14.1	C	25.3	(Intersection Eliminated)	
			PM	A	9.1	D	47.0		
4. El Embarcadero (EB) / Grand Ave	Signal		AM	A	4.7	(Intersection Eliminated)		(Intersection Eliminated)	
			PM	C	21.7				
5. Lake Park Ave / Lakeshore Ave	Signal	Signal	AM	E	77.2	F	180.2	F	279.2
			PM	D	35.2	E	60.5	F	88.1
6. MacArthur Blvd / Lakeshore Ave	Signal	Signal	AM	D	36.0	E	68.7	E	76.6
			PM	F	89.3	F	225.7	F	374.2
7. El Embarcadero (WB) / Lakeshore Ave	Minor Stop	Signal	AM	N/A[3]		B	16.6	(Intersection Eliminated)	
			PM			B	15.1		
8. El Embarcadero (EB) / Lakeshore Ave	Minor Stop		AM	E	38.2	(Intersection Eliminated)		(Intersection Eliminated)	
			PM	F	180.2				
9. Boden Way / Lakeshore Ave	Minor Stop	Minor Stop	AM	C	23.0	C	18.9	C	22.7
			PM	B	13.9	C	15.3	C	15.9
			PM	B	19.1	C	28.1	C	28.1
14. E. 18th St / Lakeshore Ave	Signal	Signal	AM	C	30.6	C	21.4	C	23.8
			PM	E	55.7	B	17.5	B	17.5
15. Foothill Blvd / Lakeshore Ave	Signal	Signal	AM	B	14.3	B	16.7	B	13.8
			PM	C	27.7	A	7.9	A	7.9
			PM	B	13.5	C	15.9	C	15.9
17. E. 15th St / 1st Ave	Signal	Signal	AM	B	15.2	B	19.8	B	19.7
			PM	C	20.8	A	6.7	A	6.7
18. Int'l Blvd / 1st Ave	Signal	Signal	AM	B	15.7	C	21.2	C	20.1
			PM	C	27.1	A	9.5	A	9.5
			PM	B	13.3	D	42.3	D	42.3
29. Embarcadero / 5th Ave	Minor Stop	Minor Stop	AM	B	12.5	F	313.0	F	313.0
			PM	E	39.0	F	462.0	F	462.0
30. 27th St/Bay Pl / Harrison St	Signal	Signal	AM	F	146.3	F	239.8	F	239.8
			PM	C	31.8	F	87.7	F	87.7
31. Grand Ave / Harrison St[4]	Signal	Signal	AM	D	39.4	F	158.4	F	158.4
			PM	C	34.8	E	64.5	E	64.5
			PM	B	14.8	B	18.5	B	18.5
39. 14th St / Lakeside Dr[4]	Signal	Signal	AM	B	13.6	B	14.0	B	13.7
			PM	B	10.9	B	11.7	B	11.7
			PM	A	4.5	A	5.7	A	5.7
47. 10th St / Oak St[4]	Signal	Signal	AM	A	8.8	F	138.4	F	138.4
			PM	A	9.7	B	16.6	B	16.6
			PM	B	16.2	B	18.5	B	18.5
51. 7th St / Oak St[4]	Signal	Signal	AM	B	13.5	B	16.0	B	16.0
			PM	B	13.3	F	100.9	F	100.9
52. Lakeshore Ave / 1st Ave		Signal	AM	(Future Intersections)		A	9.1	A	8.7
			PM			A	1.2	A	1.2

Intersection	Traffic Control (Existing)	Traffic Control (Future)	Peak Hour	Existing Conditions LOS[1]	Existing Conditions Delay[2]	Cumulative Plus Project LOS[1]	Cumulative Plus Project Delay[2]	Cumulative Plus Project With No El Embarcadero LOS[1]	Cumulative Plus Project With No El Embarcadero Delay[2]
53. 12th St / Convention Ctr [4]		Signal	AM			C	30.3	C	30.9
			PM			A	3.2	A	3.2
54. 11th-12th St / 14th St [4]		Signal	AM			B	11.3	B	11.2
			PM			C	25.3	C	25.3
55. 13th St / 14th St [4]		Signal	AM			B	12.4	B	12.4
			PM			B	14.3	B	14.3

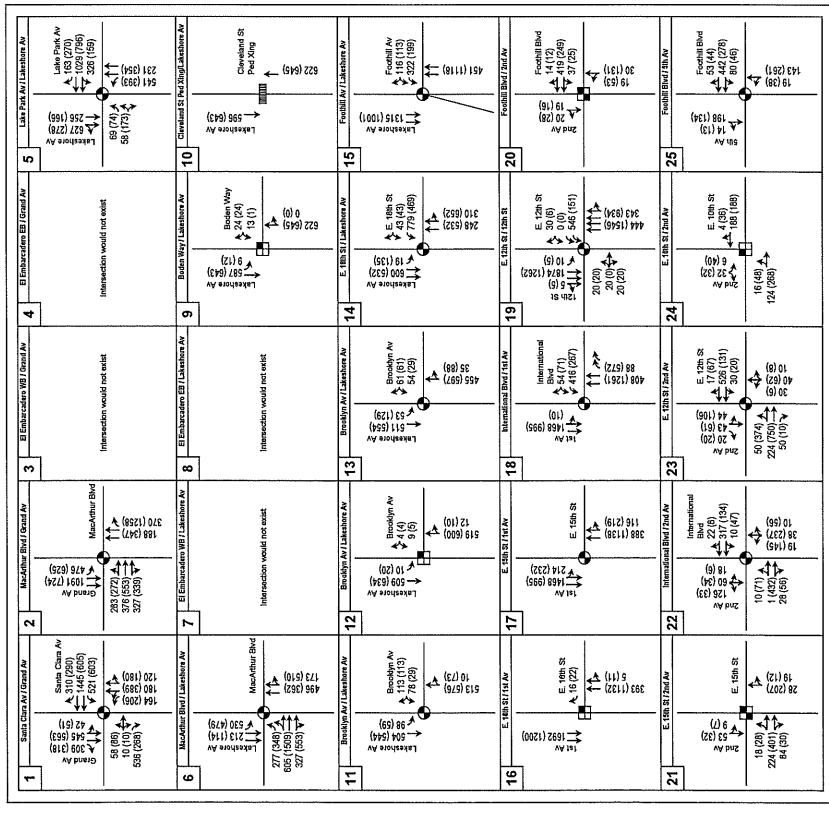
Notes:
Shaded values indicate a potential significant impact.
[1] LOS = Level of Service
[2] Average control delay in seconds per vehicle
[3] HCM LOS is not applicable for the stop-controlled approaches of this intersection.
[4] Defined as a downtown intersection
[5] The worst approach control delays and LOS are reported for side street stop-controlled intersections.
Source: Dowling Associates, 2007.

Impact TRANS-E8 (El Embarcadero Closure): Under the Cumulative Plus Project with No El Embarcadero the Lake Park Avenue/Lakeshore Avenue intersection would degrade the intersection to LOS F during the AM and PM peak hours. (S)

Mitigation Measure TRANS-E8: Modification of the Lake Park Avenue/Lakeshore Avenue intersection as described under Mitigation Measure TRANS-2 would reduce the delay from 279.2 seconds to 136.1 during the AM peak hour, but the intersection would remain at LOS F. The mitigation measure would reduce the delay from 88.1 seconds to 57.6 seconds during the PM peak hour, but the intersection would also remain at LOS E. No other feasible mitigation measures were identified at this intersection. After mitigation, the cumulative impact would remain significant and unavoidable. (SU)

Impact TRANS-E9 (El Embarcadero Closure): Under the Cumulative Plus Project with No El Embarcadero the MacArthur Boulevard/Lakeshore Avenue intersection would degrade to LOS E during the AM peak hour and the total intersection average vehicle delay would increase by 287.4 seconds during the PM peak hour. (S)

Mitigation Measure TRANS-E9: Modification of the MacArthur Boulevard/Lakeshore Avenue intersection as described under Mitigation Measure TRANS-3 would improve the intersection to LOS D during the AM peak hour and would reduce the delay from 374.2 seconds to 165.7 seconds during the PM peak hour, but the intersection would also remain at LOS F. No other feasible mitigation measures were identified at this intersection. After mitigation, the cumulative impact would remain significant and unavoidable. (SU)

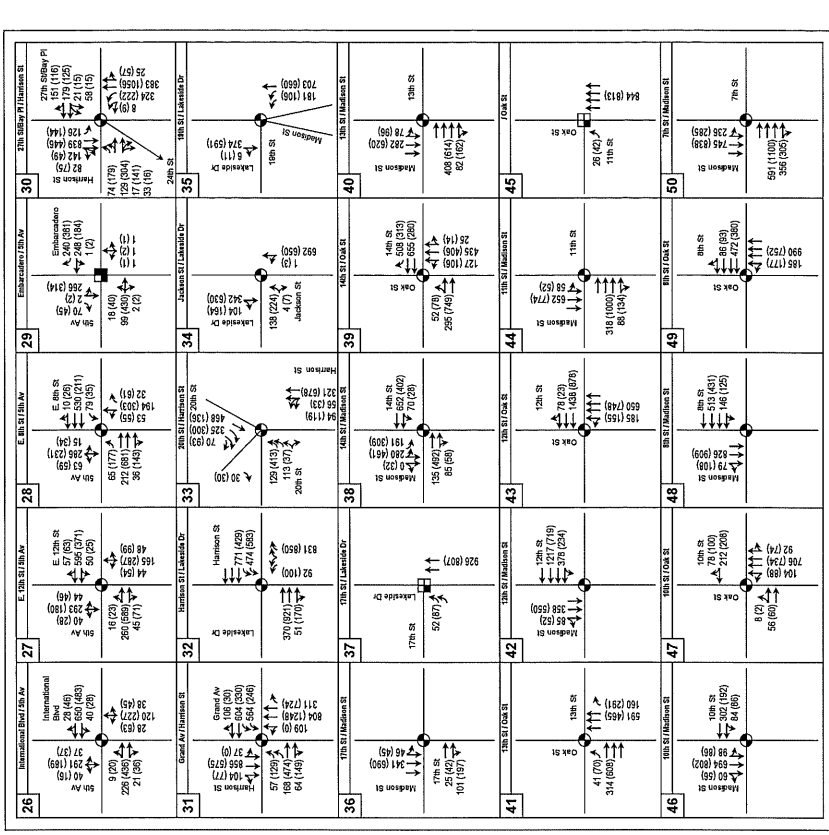


Dowling Associates, Inc.

EXISTING NO EL EMBARCADERO TRAFFIC VOLUMES, LANES, AND TRAFFIC CONTROLS

Measure DD Transportation Studies

Figure A.2



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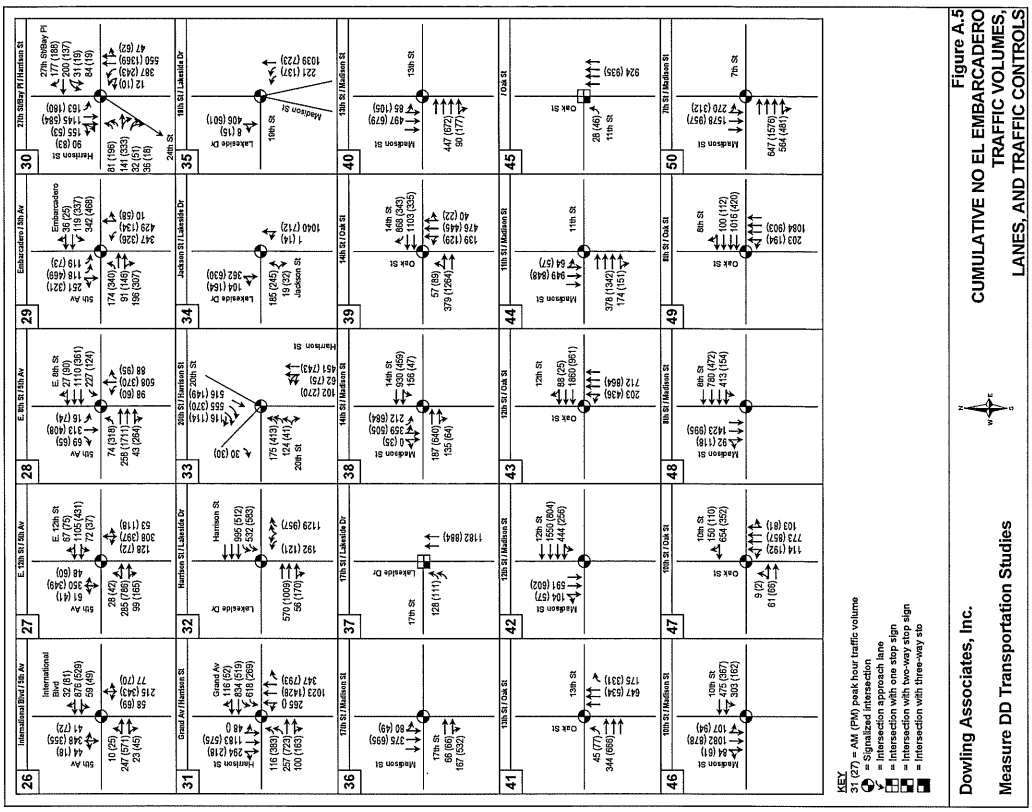
Measure DD Transportation Studies

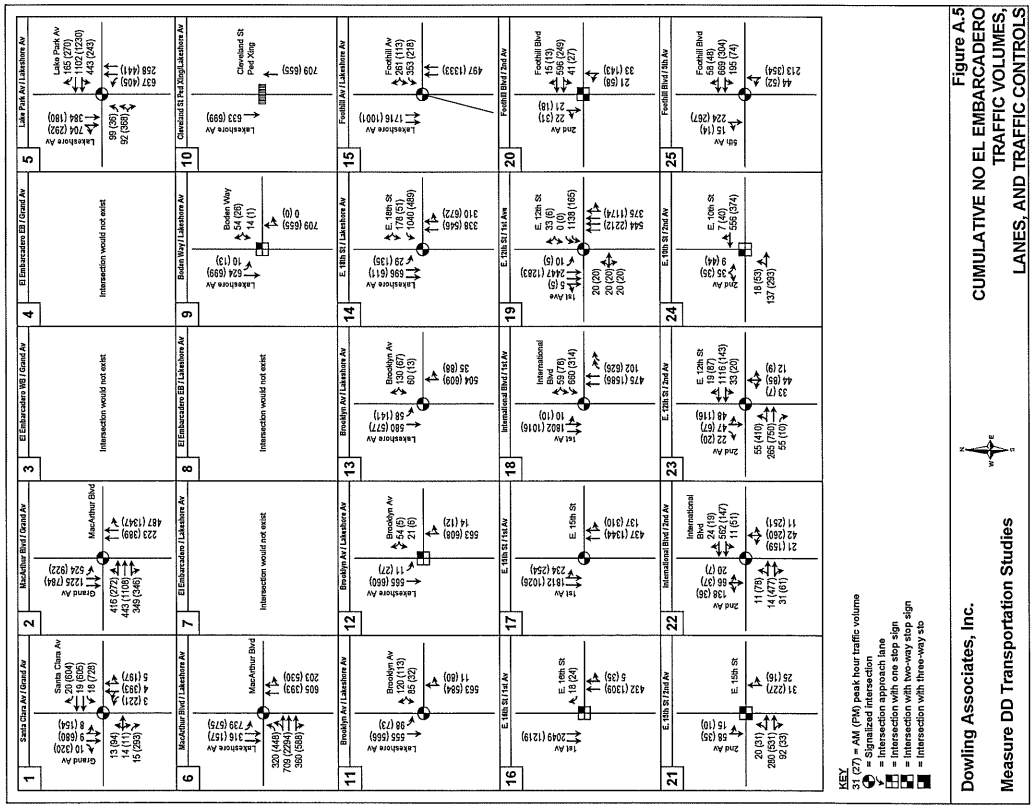
Figure A.2

Dowling Associates, Inc.

Measure DD Transportation Studies

Figure A.2
EXISTING NO EL EMBARCADERO TRAFFIC VOLUMES, LANES, AND TRAFFIC CONTROLS


KEY
31 (27) = AM (PM) peak hour traffic volume
= Signalized intersection
= Intersection approach lane
= Intersection with one stop sign
= Intersection with two-way stop sign
= Intersection with three-way sto
Dowling Associates, Inc.
CUMULATIVE NO EL EMBARCADERO TRAFFIC VOLUMES, LANES, AND TRAFFIC CONTROLS
Measure DD Transportation Studies
Figure A.5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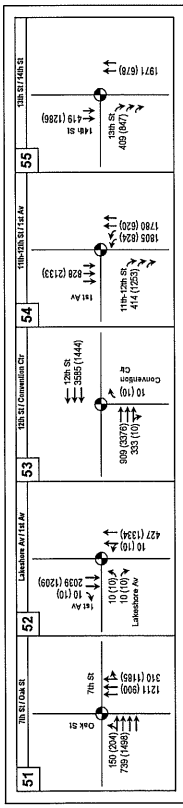
CUMULATIVE NO EL EMBARCADERO TRAFFIC VOLUMES, LANES, AND TRAFFIC CONTROLS
Measure DD Transportation Studies
Figure A.5



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Measure DD Transportation Studies

Figure A.5
CUMULATIVE NO EL EMBARCADERO
TRAFFIC VOLUMES,
LANES, AND TRAFFIC CONTROLS

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	10	536	521	1445	310	164	180	120	42	545	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.97			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.94			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1297	1151	1437	3185	1187	1449	2602			3163	1162
Flt Permitted		0.22	1.00	0.60	1.00	1.00	0.95	0.92			0.89	1.00
Satd. Flow (perm)		295	1151	903	3185	1187	1449	2411			2831	1162
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.95	0.95	0.95	0.78	0.78	0.78
Adj. Flow (vph)	65	11	602	554	1537	330	173	189	126	54	699	396
RTOR Reduction (vph)	0	51	179	0	0	55	0	68	0	0	0	30
Lane Group Flow (vph)	0	139	309	554	1537	275	156	264	0	0	753	366
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		135	527	413	1457	543	171	1126			855	351
v/s Ratio Prot					0.48		c0.11	0.03				
v/s Ratio Perm		0.47	0.27	c0.61		0.23		0.08			0.27	c0.32
v/c Ratio		1.03	0.59	1.34	1.05	0.51	0.91	0.23			0.88	1.04
Uniform Delay, d1		28.8	21.3	28.8	28.8	20.3	46.2	17.5			35.2	37.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.88	1.38			1.00	1.00
Incremental Delay, d2		85.6	4.7	169.2	39.5	3.3	45.4	0.4			12.6	59.6
Delay (s)		114.3	26.0	197.9	68.3	23.6	76.7	24.5			47.8	96.6
Level of Service		F	C	F	E	C	E	C			D	F
Approach Delay (s)		50.8			91.9			41.2			64.6	
Approach LOS		D			F			D			E	

Intersection Summary				
HCM Average Control Delay	74.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	121.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	283	376	327	0	0	0	0	188	370	476	1091	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.98						1.00	1.00	1.00	1.00	
Frt		0.95						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4330						3539	1329	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4330						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.91	0.91	0.91	0.88	0.88	0.88
Adj. Flow (vph)	292	388	337	0	0	0	0	207	407	541	1240	0
RTOR Reduction (vph)	0	39	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	978	0	0	0	0	0	207	407	541	1240	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1491						968	1329	459	1894	
v/s Ratio Prot								0.06		c0.31		
v/s Ratio Perm		0.23							0.31		c0.37	
v/c Ratio		0.66						0.21	0.31	1.18	0.65	
Uniform Delay, d1		29.4						29.7	0.0	39.2	15.6	
Progression Factor		1.00						1.00	1.00	1.01	0.85	
Incremental Delay, d2		2.3						0.5	0.6	86.9	0.5	
Delay (s)		31.7						30.2	0.6	126.3	13.8	
Level of Service		C						C	A	F	B	
Approach Delay (s)		31.7			0.0			10.6			48.0	
Approach LOS		C			A			B			D	

Intersection Summary				
HCM Average Control Delay	36.4	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	76.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	0	58	326	1029	163	541	231	0	0	256	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.90			1.00	0.97	1.00	1.00			0.89	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		0.87			1.00	0.85	1.00	1.00			0.89	
Flt Protected		0.99			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1681	1200		3497	1337	1770	3539			2645	
Flt Permitted		0.95	0.99		0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		1681	1200		3497	1337	1770	3539			2645	
Peak-hour factor, PHF	0.86	0.86	0.86	0.96	0.96	0.96	0.78	0.78	0.78	0.94	0.94	0.94
Adj. Flow (vph)	80	0	67	340	1072	170	694	296	0	0	272	667
RTOR Reduction (vph)	0	63	0	0	0	71	0	0	0	0	96	0
Lane Group Flow (vph)	72	12	0	0	1412	99	694	296	0	0	843	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0			23.5	23.5	13.0	41.0			24.0	
Effective Green, g (s)	5.0	5.0			23.5	23.5	13.0	41.0			24.0	
Actuated g/C Ratio	0.06	0.06			0.29	0.29	0.16	0.51			0.30	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	104	74			1015	388	284	1791			784	
v/s Ratio Prot	c0.04	0.01			c0.40		c0.39	0.08			c0.32	
v/s Ratio Perm						0.07						
v/c Ratio	0.69	0.16			1.39	0.26	2.44	0.17			1.43dr	
Uniform Delay, d1	37.2	36.0			28.8	22.0	34.0	10.8			26.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	31.7	4.7			182.1	1.6	660.2	0.2			54.4	
Delay (s)	68.9	40.7			210.9	23.6	694.2	11.0			82.9	
Level of Service	E	D			F	C	F	B			F	
Approach Delay (s)		54.5			190.7			489.9			82.9	
Approach LOS		D			F			F			F	

Intersection Summary				
HCM Average Control Delay	238.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.43			
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	113.6%	ICU Level of Service	H	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	605	327	0	0	0	0	496	173	530	213	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0						4.0			3.5	4.0
Lane Util. Factor		0.86						0.95			1.00	0.95
Frpb, ped/bikes		0.98						0.99			1.00	1.00
Flpb, ped/bikes		1.00						1.00			1.00	1.00
Frt		0.95						0.96			1.00	1.00
Flt Protected		1.00						1.00			0.95	1.00
Satd. Flow (prot)		4447						3145			1770	3539
Flt Permitted		1.00						1.00			0.13	1.00
Satd. Flow (perm)		4447						3145			239	3539
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	308	672	363	0	0	0	0	584	204	609	245	0
RTOR Reduction (vph)	0	88	0	0	0	0	0	33	0	0	0	0
Lane Group Flow (vph)	277	978	0	0	0	0	0	755	0	609	245	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm										pm+pt	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1301						920		604	2204	
v/s Ratio Prot								0.24		c0.30	0.07	
v/s Ratio Perm	0.18	0.22								c0.33		
v/c Ratio	0.63	0.75						0.82		1.01	0.11	
Uniform Delay, d1	32.5	34.0						34.9		29.3	8.1	
Progression Factor	1.07	1.08						1.00		1.00	1.00	
Incremental Delay, d2	4.2	2.6						8.2		38.7	0.1	
Delay (s)	39.0	39.4						43.1		67.9	8.2	
Level of Service	D	D						D		E	A	
Approach Delay (s)		39.3			0.0			43.1			50.8	
Approach LOS		D			A			D			D	

Intersection Summary				
HCM Average Control Delay	43.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	24	622	0	9	587
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.46	0.46	0.95	0.95	0.91	0.91
Hourly flow rate (vph)	28	52	655	0	10	645
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	80	655	10	645
Volume Left	28	0	10	0
Volume Right	52	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	43.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	4	519	12	10	509
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.69	0.69	0.89	0.89	0.95	0.95
Hourly flow rate (vph)	13	6	583	13	11	536
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.85	0.82			0.82	
vC, conflicting volume	1175	607			613	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	968	413			420	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	99			99	
cM capacity (veh/h)	231	518			923	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	19	597	11	536
Volume Left	13	0	11	0
Volume Right	6	13	0	0
cSH	279	1700	923	1700
Volume to Capacity	0.07	0.35	0.01	0.32
Queue Length 95th (ft)	5	0	1	0
Control Delay (s)	18.9	0.0	8.9	0.0
Lane LOS	C		A	
Approach Delay (s)	18.9	0.0	0.2	
Approach LOS	C			

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	38.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	393	5	0	1692
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	427	5	0	1839
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.74	0.99			0.99	
vC, conflicting volume	1419	356			503	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	794	323			472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	227	589			1011	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	285	148	920	920
Volume Left	0	0	0	0	0
Volume Right	17	0	5	0	0
cSH	589	1700	1700	1700	1700
Volume to Capacity	0.03	0.17	0.09	0.54	0.54
Queue Length 95th (ft)	2	0	0	0	0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.3	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	65.8%	ICU Level of Service		C
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	37	419	14	19	30	0	0	19	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.61	0.61	0.61	0.89	0.89	0.89
Hourly flow rate (vph)	0	0	0	42	476	16	31	49	0	0	21	22
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	495			26			406	605	26	596	597	274
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			26			406	605	26	596	597	274
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			93	87	100	100	95	97
cM capacity (veh/h)	1062			1552			462	390	1021	336	394	722

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	280	254	80	44
Volume Left	42	0	31	0
Volume Right	0	16	0	22
cSH	1552	1700	415	513
Volume to Capacity	0.03	0.15	0.19	0.09
Queue Length 95th (ft)	2	0	18	7
Control Delay (s)	1.3	0.0	15.7	12.7
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.7	12.7
Approach LOS			C	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	29.1%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	622	0	0	696
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.91	0.91
Adj. Flow (vph)	0	0	655	0	0	655
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	655	0	0	655
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.40			0.40
v/s Ratio Perm						
v/c Ratio			0.48			0.48
Uniform Delay, d1			2.5			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.1
Delay (s)			2.5			2.5
Level of Service			A			A
Approach Delay (s)	0.0		2.5			2.5
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	2.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	78	113	513	10	98	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.91		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.92		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1334		1621		1770	1863
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1334		1621		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	123	558	11	107	548
RTOR Reduction (vph)	103	0	1	0	0	0
Lane Group Flow (vph)	105	0	568	0	107	548
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	6.2		20.0		2.8	26.8
Effective Green, g (s)	6.2		20.0		2.8	26.8
Actuated g/C Ratio	0.16		0.51		0.07	0.69
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	212		831		127	1280
v/s Ratio Prot	c0.08		c0.35		c0.06	0.29
v/s Ratio Perm						
v/c Ratio	0.49		0.68		0.84	0.43
Uniform Delay, d1	15.0		7.1		17.9	2.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.7		1.9		35.9	0.1
Delay (s)	15.6		9.0		53.7	2.8
Level of Service	B		A		D	A
Approach Delay (s)	15.6		9.0			11.1
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	54	61	455	35	53	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.96		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.93		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1421		1607		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1421		1607		1770	1630
Peak-hour factor, PHF	0.86	0.86	0.87	0.87	0.96	0.96
Adj. Flow (vph)	63	71	523	40	55	532
RTOR Reduction (vph)	47	0	5	0	0	0
Lane Group Flow (vph)	87	0	558	0	55	532
Confl. Peds. (#/hr)	70	31		17	17	
Confl. Bikes (#/hr)		7		15		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		24.0		5.0	33.0
Effective Green, g (s)	20.0		24.0		5.0	33.0
Actuated g/C Ratio	0.33		0.40		0.08	0.55
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	474		643		148	897
v/s Ratio Prot	c0.06		c0.35		0.03	c0.33
v/s Ratio Perm						
v/c Ratio	0.18		0.87		0.37	0.59
Uniform Delay, d1	14.2		16.5		26.0	9.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.8		14.8		7.0	2.9
Delay (s)	15.0		31.3		33.0	11.9
Level of Service	B		C		C	B
Approach Delay (s)	15.0		31.3			13.9
Approach LOS	B		C			B

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Volume (vph)	779	43	248	310	19	600
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.96		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.95		1.00		0.95	1.00
Satd. Flow (prot)	3363		2910		1770	3539
Flt Permitted	0.95		1.00		0.95	1.00
Satd. Flow (perm)	3363		2910		1770	3539
Peak-hour factor, PHF	0.93	0.93	0.90	0.90	0.92	0.92
Adj. Flow (vph)	838	46	276	344	21	652
RTOR Reduction (vph)	5	0	158	0	0	0
Lane Group Flow (vph)	879	0	462	0	21	652
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	6		2		1	
Permitted Phases						6
Actuated Green, G (s)	29.5		48.7		2.8	54.5
Effective Green, g (s)	29.5		48.7		2.8	54.5
Actuated g/C Ratio	0.33		0.54		0.03	0.61
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	1102		1575		55	2143
v/s Ratio Prot	c0.26		0.16		0.01	
v/s Ratio Perm						c0.18
v/c Ratio	0.80		0.29		0.38	0.30
Uniform Delay, d1	27.5		11.3		42.8	8.6
Progression Factor	1.00		0.96		1.00	1.00
Incremental Delay, d2	3.8		0.5		1.6	0.4
Delay (s)	31.4		11.3		44.4	8.9
Level of Service	C		B		D	A
Approach Delay (s)	31.4		11.3			10.1
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Foothill Blvd #2 & Lakeshore Av #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	322	116	451	0	0	1315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.96		1.00			1.00
Flt Protected	0.96		1.00			1.00
Satd. Flow (prot)	3187		3406			3406
Flt Permitted	0.96		1.00			1.00
Satd. Flow (perm)	3187		3406			3406
Peak-hour factor, PHF	0.90	0.90	0.82	0.82	0.87	0.87
Adj. Flow (vph)	358	129	550	0	0	1511
RTOR Reduction (vph)	42	0	0	0	0	0
Lane Group Flow (vph)	445	0	550	0	0	1511
Confl. Peds. (#/hr)		43				
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	22.5		61.0			61.0
Effective Green, g (s)	22.5		61.0			61.0
Actuated g/C Ratio	0.25		0.68			0.68
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	797		2309			2309
v/s Ratio Prot	c0.14		0.16			c0.44
v/s Ratio Perm						
v/c Ratio	0.56		0.24			0.65
Uniform Delay, d1	29.4		5.6			8.4
Progression Factor	1.00		0.60			0.59
Incremental Delay, d2	2.8		0.2			1.3
Delay (s)	32.2		3.6			6.3
Level of Service	C		A			A
Approach Delay (s)	32.2		3.6			6.3
Approach LOS	C		A			A

Intersection Summary				
HCM Average Control Delay	10.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	58.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	388	116	214	1468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.97			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3262			3400
Flt Permitted			1.00			0.76
Satd. Flow (perm)			3262			2610
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	0	0	436	130	233	1596
RTOR Reduction (vph)	0	0	13	0	0	0
Lane Group Flow (vph)	0	0	553	0	0	1829
Confl. Peds. (#/hr)				17		
Confl. Bikes (#/hr)				4		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type					pm+pt	
Protected Phases			2		1 4	6
Permitted Phases					6	
Actuated Green, G (s)			76.4			82.0
Effective Green, g (s)			76.4			82.0
Actuated g/C Ratio			0.85			0.91
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2769			2427
v/s Ratio Prot			0.17			c0.05
v/s Ratio Perm						c0.64
v/c Ratio			0.20			0.75
Uniform Delay, d1			1.2			1.1
Progression Factor			0.46			10.35
Incremental Delay, d2			0.2			1.0
Delay (s)			0.7			12.7
Level of Service			A			B
Approach Delay (s)	0.0		0.7			12.7
Approach LOS	A		A			B

Intersection Summary				
HCM Average Control Delay	9.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	68.3%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	416	54	408	88	0	1468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.99		1.00	0.96		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.98		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3294		3406	2619		3406
Flt Permitted	0.96		1.00	1.00		1.00
Satd. Flow (perm)	3294		3406	2619		3406
Peak-hour factor, PHF	0.85	0.85	0.91	0.91	0.69	0.69
Adj. Flow (vph)	489	64	448	97	0	2128
RTOR Reduction (vph)	13	0	0	29	0	0
Lane Group Flow (vph)	540	0	448	68	0	2128
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	19.0		63.0	63.0		63.0
Effective Green, g (s)	19.0		63.0	63.0		63.0
Actuated g/C Ratio	0.21		0.70	0.70		0.70
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	695		2384	1833		2384
v/s Ratio Prot	c0.16		0.13			c0.62
v/s Ratio Perm				0.03		
v/c Ratio	0.78		0.19	0.04		0.89
Uniform Delay, d1	33.5		4.7	4.2		10.8
Progression Factor	1.00		0.40	0.00		0.71
Incremental Delay, d2	5.0		0.2	0.0		4.8
Delay (s)	38.5		2.1	0.1		12.5
Level of Service	D		A	A		B
Approach Delay (s)	38.5		1.7			12.5
Approach LOS	D		A			B

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Driveway & 1st Ave #1#2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	546	0	30	0	444	343	10	1874	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.94		1.00	0.98			0.94		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		0.97	1.00	
Frt		0.96		1.00	0.98			0.93		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1639		3221	1562			5364		1713	4890	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1639		3221	1562			5364		1713	4890	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	593	0	33	0	483	373	11	2037	5
RTOR Reduction (vph)	0	20	0	0	9	0	0	110	0	0	0	0
Lane Group Flow (vph)	0	46	0	421	196	0	0	746	0	11	2042	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)								5				
Turn Type	Split			Split							Prot	
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		6.7		17.6	17.6			48.9		0.8	53.7	
Effective Green, g (s)		6.7		17.6	17.6			48.9		0.8	53.7	
Actuated g/C Ratio		0.07		0.20	0.20			0.54		0.01	0.60	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		122		630	305			2914		15	2918	
v/s Ratio Prot		c0.03		c0.13	0.13			0.14		0.01	c0.42	
v/s Ratio Perm												
v/c Ratio		0.37		0.67	0.64			0.26		0.73	0.70	
Uniform Delay, d1		39.7		33.5	33.3			10.9		44.5	12.6	
Progression Factor		1.00		1.14	1.15			0.12		1.00	1.03	
Incremental Delay, d2		0.7		1.9	3.2			0.2		57.0	0.7	
Delay (s)		40.4		40.1	41.4			1.5		101.5	13.7	
Level of Service		D		D	D			A		F	B	
Approach Delay (s)		40.4			40.5			1.5			14.1	
Approach LOS		D			D			A			B	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	63.5%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	224	64	0	0	0	0	26	19	9	53	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.59	0.59	0.59	0.78	0.78	0.78
Hourly flow rate (vph)	20	246	92	0	0	0	0	47	32	12	68	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	17			365			393	376	226	266	422	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			287			315	297	143	184	345	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	92	96	98	87	100
cM capacity (veh/h)	1576			1208			507	566	833	631	533	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	143	215	80	79
Volume Left	20	0	0	12
Volume Right	0	92	32	0
cSH	1576	1700	651	545
Volume to Capacity	0.01	0.13	0.12	0.15
Queue Length 95th (ft)	1	0	10	13
Control Delay (s)	1.1	0.0	11.3	12.7
Lane LOS	A		B	B
Approach Delay (s)	0.4		11.3	12.7
Approach LOS			B	B

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	28.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	16	124	188	4	6	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	135	204	4	7	35
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				516	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				516	347
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	94
cM capacity (veh/h)	1209				454	618

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	152	209	41
Volume Left	17	0	7
Volume Right	0	4	35
cSH	1209	1700	584
Volume to Capacity	0.01	0.12	0.07
Queue Length 95th (ft)	1	0	6
Control Delay (s)	1.0	0.0	11.6
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	11.6
Approach LOS			B

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	18	99	2	1	248	240	1	1	1	266	2	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	108	2	1	270	261	1	1	1	289	2	76

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	129	271	261	3	291	76
Volume Left (vph)	20	1	0	1	289	0
Volume Right (vph)	2	0	261	1	0	76
Hadj (s)	0.05	0.04	-0.67	-0.10	0.53	-0.67
Departure Headway (s)	6.4	5.9	5.2	6.8	6.7	5.5
Degree Utilization, x	0.23	0.45	0.38	0.01	0.54	0.12
Capacity (veh/h)	532	586	664	475	515	617
Control Delay (s)	11.3	12.4	10.2	9.8	16.2	8.0
Approach Delay (s)	11.3	11.3		9.8	14.5	
Approach LOS	B	B		A	B	

Intersection Summary				
Delay	12.5			
HCM Level of Service	B			
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	52	0	0	926	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.89	0.89	0.92	0.92
Hourly flow rate (vph)	68	0	0	1040	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked	0.95					
vC, conflicting volume	590	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	100	100			
cM capacity (veh/h)	497	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	34	34	520	520
Volume Left	34	34	0	0
Volume Right	0	0	0	0
cSH	497	497	1700	1700
Volume to Capacity	0.07	0.07	0.31	0.31
Queue Length 95th (ft)	6	6	0	0
Control Delay (s)	12.8	12.8	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	12.8		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	10	1	28	10	317	22	19	39	10	16	60	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.93			0.99			0.99			0.95	
Flpb, ped/bikes		0.99			1.00			0.99			0.99	
Frt		0.89			0.99			0.98			0.92	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		2681			3198			1530			1400	
Flt Permitted		0.87			0.95			0.92			0.98	
Satd. Flow (perm)		2364			3041			1433			1380	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1	30	11	345	24	21	41	11	20	65	137
RTOR Reduction (vph)	0	24	0	0	16	0	0	3	0	0	36	0
Lane Group Flow (vph)	0	18	0	0	364	0	0	70	0	0	186	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		12.5			12.5			46.5			46.5	
Effective Green, g (s)		12.5			12.5			46.5			46.5	
Actuated g/C Ratio		0.19			0.19			0.72			0.72	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		455			585			1025			987	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.12			0.05			c0.13	
v/c Ratio		0.04			0.62			0.07			0.19	
Uniform Delay, d1		21.4			24.1			2.8			3.0	
Progression Factor		1.00			0.49			1.00			1.00	
Incremental Delay, d2		0.0			1.3			0.1			0.4	
Delay (s)		21.4			13.1			2.9			3.5	
Level of Service		C			B			A			A	
Approach Delay (s)		21.4			13.1			2.9			3.5	
Approach LOS		C			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	53.9%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
23: E. 12TH & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	↱
Volume (vph)	50	224	50	30	526	17	30	40	10	44	43	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		0.98			1.00			0.99			1.00	0.92
Flpb, ped/bikes		0.99			1.00			0.98			0.97	1.00
Frt		0.98			1.00			0.98			1.00	0.85
Flt Protected		0.99			1.00			0.98			0.98	1.00
Satd. Flow (prot)		3125			3487			1526			1769	1459
Flt Permitted		0.83			0.93			0.88			0.83	1.00
Satd. Flow (perm)		2618			3241			1364			1510	1459
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	243	54	33	572	18	33	43	11	48	47	22
RTOR Reduction (vph)	0	32	0	0	5	0	0	7	0	0	0	14
Lane Group Flow (vph)	0	319	0	0	618	0	0	80	0	0	95	8
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5				5		5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		18.5			18.5			17.0			17.0	17.0
Effective Green, g (s)		18.6			18.5			17.0			17.0	17.0
Actuated g/C Ratio		0.41			0.41			0.38			0.38	0.38
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1076			1332			515			570	551
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.19			0.06			c0.06	0.01
v/c Ratio		0.30			0.46			0.18			0.17	0.02
Uniform Delay, d1		8.9			9.6			9.3			9.3	8.8
Progression Factor		0.56			1.00			1.06			1.00	1.00
Incremental Delay, d2		0.7			1.2			0.6			0.6	0.1
Delay (s)		5.7			10.8			10.5			9.9	8.8
Level of Service		A			B			B			A	A
Approach Delay (s)		5.7			10.8			10.5			9.7	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	9.1	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.32			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.5	
Intersection Capacity Utilization	56.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↑			↳	
Volume (vph)	0	0	0	80	442	63	19	143	0	0	198	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3219			1655			1651	
Flt Permitted					0.99			0.96			1.00	
Satd. Flow (perm)					3219			1599			1651	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	87	480	58	21	155	0	0	215	15
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	613	0	0	176	0	0	226	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1337			775			800	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.19			0.11				
v/c Ratio					0.46			0.23			0.28	
Uniform Delay, d1					13.7			9.7			10.0	
Progression Factor					1.00			0.97			1.00	
Incremental Delay, d2					1.1			0.7			0.9	
Delay (s)					14.9			10.1			10.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			14.9			10.1			10.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	52.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (vph)	9	226	21	40	650	26	26	120	38	37	291	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3283			3310			1590			1626	
Flt Permitted		0.93			0.93			0.92			0.96	
Satd. Flow (perm)		3066			3073			1468			1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	246	23	43	707	30	30	130	41	40	316	43
RTOR Reduction (vph)	0	10	0	0	4	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	269	0	0	776	0	0	187	0	0	392	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1391			1395			632			673	
v/s Ratio Prot												
v/s Ratio Perm		0.09			c0.25			0.13			c0.25	
v/c Ratio		0.19			0.56			0.30			0.58	
Uniform Delay, d1		10.6			13.0			12.1			14.1	
Progression Factor		1.00			1.00			1.06			0.74	
Incremental Delay, d2		0.3			1.6			1.1			3.6	
Delay (s)		10.9			14.6			13.8			13.9	
Level of Service		B			B			B			B	
Approach Delay (s)		10.9			14.6			13.8			13.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑			↑	
Volume (vph)	16	260	46	50	695	57	44	165	48	44	293	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3235			3273			1591			1624	
Flt Permitted		0.92			0.91			0.90			0.94	
Satd. Flow (perm)		2972			2979			1450			1533	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	283	49	54	647	62	48	179	52	48	318	43
RTOR Reduction (vph)	0	20	0	0	10	0	0	13	0	0	7	0
Lane Group Flow (vph)	0	329	0	0	753	0	0	266	0	0	402	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			26.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1509			1512			558			590	
v/s Ratio Prot												
v/s Ratio Perm		0.11			c0.25			0.18			c0.26	
v/c Ratio		0.22			0.50			0.48			0.68	
Uniform Delay, d1		8.9			10.5			15.1			16.7	
Progression Factor		1.00			1.00			0.67			0.74	
Incremental Delay, d2		0.3			1.2			2.8			5.4	
Delay (s)		9.2			11.7			12.9			17.7	
Level of Service		A			B			B			B	
Approach Delay (s)		9.2			11.7			12.9			17.7	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM Average Control Delay	12.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	89.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑	↑		↑	
Volume (vph)	65	212	36	79	530	10	53	194	32	15	286	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00			1.00	0.91		0.99	
Flpb, ped/bikes	0.96	1.00		0.94	1.00			0.99	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	1703	4726		1663	4891			1647	1448		1607	
Flt Permitted	0.40	1.00		0.58	1.00			0.87	1.00		0.99	
Satd. Flow (perm)	712	4726		1014	4891			1445	1448		1588	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	230	39	86	576	11	58	211	35	16	311	68
RTOR Reduction (vph)	0	22	0	0	3	0	0	0	19	0	11	0
Lane Group Flow (vph)	71	247	0	86	584	0	0	269	16	0	384	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	307	2036		437	2107			667	668		733	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm	0.10			0.08				0.19	0.01		c0.24	
v/c Ratio	0.23	0.12		0.20	0.28			0.40	0.02		0.52	
Uniform Delay, d1	11.7	11.1		11.5	12.0			11.6	9.5		12.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.50	
Incremental Delay, d2	1.8	0.1		1.0	0.3			1.8	0.1		2.1	
Delay (s)	13.5	11.2		12.5	12.3			13.4	9.6		8.3	
Level of Service	B	B		B	B			B	A		A	
Approach Delay (s)		11.7			12.3			13.0			8.3	
Approach LOS		B			B			B			A	

Intersection Summary				
HCM Average Control Delay	11.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations		↑↑	↑↑		↑	↑↑			↑	↑↑		
Volume (vph)	8	324	383	25	126	839	142	82	74	129	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.93		
Flpb, ped/bikes		1.00	1.00		0.98	1.00			0.97	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.96		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3288		1734	3063			1558	2828		
Flt Permitted		0.21	1.00		0.50	1.00			0.42	0.94		
Satd. Flow (perm)		761	3288		904	3063			695	2652		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	352	416	27	137	912	154	89	80	140	18	36
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	0	19	0	0
Lane Group Flow (vph)	0	361	438	0	137	1148	0	0	72	163	0	0
Confl. Peds. (#/hr)					70		70	70	70		70	70
Confl. Bikes (#/hr)							16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Perm				Perm			
Protected Phases		5	2			6				4		
Permitted Phases	5				6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		161	1863		271	919			224	855		
v/s Ratio Prot			0.13			c0.37						
v/s Ratio Perm		c0.47			0.15				0.10	0.07		
v/c Ratio		2.24	0.23		0.51	1.25			0.32	0.21		
Uniform Delay, d1		35.5	9.7		26.0	31.5			23.1	22.2		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		578.5	0.3		6.6	121.2			3.8	0.6		
Delay (s)		614.0	10.0		32.6	152.7			26.8	22.8		
Level of Service		F	B		C	F			C	C		
Approach Delay (s)			281.2			140.0				23.8		
Approach LOS			F			F				C		

Intersection Summary				
HCM Average Control Delay	150.9	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	105.9%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations			↑↑	
Volume (vph)	58	21	179	151
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.97	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3105	
Flt Permitted			0.84	
Satd. Flow (perm)			2619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	23	195	164
RTOR Reduction (vph)	0	0	94	0
Lane Group Flow (vph)	0	0	351	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			844	
v/s Ratio Prot				
v/s Ratio Perm			c0.13	
v/c Ratio			0.42	
Uniform Delay, d1			23.9	
Progression Factor			1.00	
Incremental Delay, d2			1.5	
Delay (s)			25.4	
Level of Service			C	
Approach Delay (s)			25.4	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	168	64	564	604	106	109	804	311	37	856	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3257		3400	3364			5004	1464		4699	
Flt Permitted	0.95	1.00		0.95	1.00			0.66	1.00		0.82	
Satd. Flow (perm)	3433	3257		3400	3364			3307	1464		3854	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	58	171	65	613	657	115	118	874	338	41	951	116
RTOR Reduction (vph)	0	19	0	0	14	0	0	0	234	0	15	0
Lane Group Flow (vph)	58	217	0	613	756	0	0	992	104	0	1093	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			5			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Effective Green, g (s)	4.9	12.6		31.4	40.1			26.1	26.1		26.1	
Actuated g/C Ratio	0.06	0.15		0.37	0.47			0.31	0.31		0.31	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	198	482		1255	1585			1014	449		1182	
v/s Ratio Prot	0.02	c0.07		0.18	c0.23							
v/s Ratio Perm								c0.30	0.07		0.28	
v/c Ratio	0.29	0.45		0.49	0.48			1.34d	0.23		0.93	
Uniform Delay, d1	38.4	33.1		20.7	15.4			29.2	22.0		28.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.2		0.1	1.0			22.7	0.1		11.9	
Delay (s)	38.7	33.3		20.8	16.4			52.0	22.1		40.5	
Level of Service	D	C		C	B			D	C		D	
Approach Delay (s)		34.4			18.3			44.4			40.5	
Approach LOS		C			B			D			D	

Intersection Summary				
HCM Average Control Delay	33.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	96.9%	ICU Level of Service	F	
Analysis Period (min)	15			

d Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: 20th St #3 & Lakeside Dr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	370	51	474	771	92	831
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.99		1.00	1.00	0.90	0.68
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.88	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4747		3367	4893	2814	1264
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4747		3367	4893	2814	1264
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.94	0.92
Adj. Flow (vph)	402	53	515	838	98	903
RTOR Reduction (vph)	21	0	0	0	283	282
Lane Group Flow (vph)	434	0	515	838	268	169
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	19.0		19.0	42.0	30.0	30.0
Effective Green, g (s)	19.0		19.0	42.0	30.0	30.0
Actuated g/C Ratio	0.24		0.24	0.52	0.38	0.38
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1127		800	2569	1055	474
v/s Ratio Prot	c0.09		c0.15	0.17	0.10	
v/s Ratio Perm						c0.13
v/c Ratio	0.39		0.64	0.33	0.25	0.36
Uniform Delay, d1	25.6		27.5	10.9	17.3	18.0
Progression Factor	0.99		0.88	0.95	1.00	1.00
Incremental Delay, d2	0.9		3.0	0.3	0.6	2.1
Delay (s)	26.4		27.1	10.6	17.6	20.1
Level of Service	C		C	B	B	C
Approach Delay (s)	26.4			16.9	18.9	
Approach LOS	C			B	B	

Intersection Summary				
HCM Average Control Delay	19.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	129	113	468	325	70	94	56	0	321	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.94		1.00	1.00	0.83			0.97	0.91	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.93		1.00	1.00	0.85			0.94	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4366		1770	3406	1317			1562	1407	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4366		1770	3406	1317			1562	1407	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	140	123	509	353	76	102	61	0	349	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	28	174	0	0
Lane Group Flow (vph)	263	0	509	353	76	0	0	236	74	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Effective Green, g (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Actuated g/C Ratio	0.21		0.34	0.48	0.48			0.30	0.30	0.08	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	928		597	1618	626			469	422	121	1611
v/s Ratio Prot	c0.06		c0.29	0.10				c0.15		0.02	
v/s Ratio Perm					0.06				0.05		0.01
v/c Ratio	0.28		0.85	0.22	0.12			0.50	0.18	0.27	0.01
Uniform Delay, d1	26.4		24.6	12.3	11.7			23.1	20.7	34.9	0.0
Progression Factor	1.00		0.63	0.30	0.26			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8		13.8	0.3	0.4			3.8	0.9	5.5	0.0
Delay (s)	27.2		29.4	4.0	3.4			26.9	21.6	40.4	0.0
Level of Service	C		C	A	A			C	C	D	A
Approach Delay (s)	27.2			17.7				24.3			
Approach LOS	C			B				C			

Intersection Summary				
HCM Average Control Delay	21.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	70.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	138	4	1	692	342	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1518			1630	1557	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1518			1629	1557	
Peak-hour factor, PHF	0.85	0.85	0.97	0.97	0.85	0.85
Adj. Flow (vph)	162	5	1	713	402	122
RTOR Reduction (vph)	2	0	0	0	22	0
Lane Group Flow (vph)	165	0	0	714	502	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4			6		
Permitted Phases			2	2		
Actuated Green, G (s)	13.0			30.0	30.0	
Effective Green, g (s)	13.0			30.0	30.0	
Actuated g/C Ratio	0.26			0.60	0.60	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	395			977	934	
v/s Ratio Prot	c0.11				0.32	
v/s Ratio Perm				c0.44		
v/c Ratio	0.42			0.73	0.54	
Uniform Delay, d1	15.4			7.1	5.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	3.2			4.8	2.2	
Delay (s)	18.6			11.9	8.1	
Level of Service	B			B	A	
Approach Delay (s)	18.6			11.9	8.1	
Approach LOS	B			B	A	

Intersection Summary				
HCM Average Control Delay	11.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	54.7%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & 19th St 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	374	6	0	0	0	0	181	703	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3316	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3316	1548		
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92
Adj. Flow (vph)	0	416	7	0	0	0	0	199	773	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	423	0	0	0	0	0	199	773	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		18.5						20.0	45.0		
Effective Green, g (s)		18.5						20.0	41.5		
Actuated g/C Ratio		0.41						0.44	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		636						1475	1428		
v/s Ratio Prot		c0.27						0.06			
v/s Ratio Perm									c0.50		
v/c Ratio		0.67						0.13	0.54		
Uniform Delay, d1		10.7						7.4	0.3		
Progression Factor		1.00						1.08	1.00		
Incremental Delay, d2		5.4						0.2	1.3		
Delay (s)		16.2						8.1	1.6		
Level of Service		B						A	A		
Approach Delay (s)	16.2				0.0			2.9		0.0	
Approach LOS	B				A			A		A	

Intersection Summary				
HCM Average Control Delay	6.9	HCM Level of Service		A
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	46.9%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	25	101	0	0	0	0	0	0	46	341	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2758									4795	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2758									4795	
Peak-hour factor, PHF	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.92	0.81	0.81	0.81
Adj. Flow (vph)	0	33	135	0	0	0	0	0	0	57	421	0
RTOR Reduction (vph)	0	92	0	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	0	77	0	0	0	0	0	0	0	0	451	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		889									2557	
v/s Ratio Prot		c0.03										
v/s Ratio Perm											0.09	
v/c Ratio		0.09									0.18	
Uniform Delay, d1		10.6									5.4	
Progression Factor		1.00									1.10	
Incremental Delay, d2		0.2									0.1	
Delay (s)		10.8									6.1	
Level of Service		B									A	
Approach Delay (s)		10.8			0.0			0.0			6.1	
Approach LOS		B			A			A			A	

Intersection Summary				
HCM Average Control Delay	7.3	HCM Level of Service		A
HCM Volume to Capacity ratio	0.14			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	43.1%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	135	85	70	652	0	0	0	0	191	280	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		2999			3238					1265	3121	
Flt Permitted		1.00			0.90					0.95	0.99	
Satd. Flow (perm)		2999			2940					1265	3121	
Peak-hour factor, PHF	0.96	0.96	0.96	0.82	0.82	0.82	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	141	89	85	795	0	0	0	0	205	301	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	183	0	0	880	0	0	0	0	164	342	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1400			1372					478	1179	
v/s Ratio Prot		0.06										
v/s Ratio Perm					c0.30					c0.13	0.11	
v/c Ratio		0.13			0.64					0.34	0.29	
Uniform Delay, d1		6.8			9.1					10.0	9.8	
Progression Factor		1.00			0.75					1.95	1.95	
Incremental Delay, d2		0.2			2.2					1.9	0.6	
Delay (s)		7.0			9.1					21.5	19.7	
Level of Service		A			A					C	B	
Approach Delay (s)		7.0			9.1			0.0			20.3	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	12.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	56.4%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	295	0	0	655	508	127	435	25	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.84		1.00				
Flpb, ped/bikes		0.99			1.00	1.00		0.97				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		0.99			1.00	1.00		0.99				
Satd. Flow (prot)		3162			3471	1332		4573				
Flt Permitted		0.79			1.00	1.00		0.99				
Satd. Flow (perm)		2523			3471	1332		4573				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	56	317	0	0	689	535	138	473	27	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	15	0	6	0	0	0	0
Lane Group Flow (vph)	0	373	0	0	689	520	0	632	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		64.3			64.3	64.3		17.2				
Effective Green, g (s)		64.3			64.3	64.3		17.2				
Actuated g/C Ratio		0.71			0.71	0.71		0.19				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1803			2480	952		874				
v/s Ratio Prot					0.20							
v/s Ratio Perm		0.15				c0.39		0.14				
v/c Ratio		0.21			0.28	0.55		0.72				
Uniform Delay, d1		4.3			4.6	6.0		34.2				
Progression Factor		0.75			1.13	1.00		0.71				
Incremental Delay, d2		0.3			0.3	2.2		2.5				
Delay (s)		3.5			5.4	8.2		26.8				
Level of Service		A			A	A		C				
Approach Delay (s)		3.5			6.6			26.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	11.9	HCM Level of Service		B
HCM Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	76.9%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	408	82	0	0	0	0	0	0	78	282	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5939									4714	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5939									4714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	443	89	0	0	0	0	0	0	85	307	0
RTOR Reduction (vph)	0	47	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	485	0	0	0	0	0	0	0	0	339	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2772									1781	
v/s Ratio Prot		c0.08										
v/s Ratio Perm											0.07	
v/c Ratio		0.17									0.19	
Uniform Delay, d1		7.0									9.4	
Progression Factor		1.00									1.54	
Incremental Delay, d2		0.1									0.2	
Delay (s)		7.1									14.7	
Level of Service		A									B	
Approach Delay (s)		7.1			0.0			0.0			14.7	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	10.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.18			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	28.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑	↱			
Volume (vph)	41	314	0	0	0	0	0	591	160	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.92			
Flpb, ped/bikes	0.98	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1512	4873						4831	1450			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1512	4873						4831	1450			
Peak-hour factor, PHF	0.76	0.76	0.76	0.92	0.92	0.92	0.89	0.89	0.89	0.92	0.92	0.92
Adj. Flow (vph)	54	413	0	0	0	0	0	664	180	0	0	0
RTOR Reduction (vph)	31	0	0	0	0	0	0	0	104	0	0	0
Lane Group Flow (vph)	23	413	0	0	0	0	0	664	76	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	655	2112						2040	612			
v/s Ratio Prot		c0.08						c0.14				
v/s Ratio Perm	0.02								0.05			
v/c Ratio	0.04	0.20						0.33	0.12			
Uniform Delay, d1	7.3	7.9						8.7	7.9			
Progression Factor	1.12	0.80						2.00	4.97			
Incremental Delay, d2	0.1	0.2						0.4	0.4			
Delay (s)	8.3	6.5						17.8	39.8			
Level of Service	A	A						B	D			
Approach Delay (s)		6.7			0.0			22.5			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	16.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	49.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↳	
Volume (vph)	0	0	0	378	1217	0	0	0	0	0	358	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.97	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5917						4623	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5917						4623	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	420	1352	0	0	0	0	0	411	98
RTOR Reduction (vph)	0	0	0	0	124	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	1648	0	0	0	0	0	496	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.36	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2761						1746	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.28							
v/c Ratio					0.60						0.28	
Uniform Delay, d1					8.9						9.8	
Progression Factor					0.22						1.52	
Incremental Delay, d2					0.6						0.4	
Delay (s)					2.6						15.2	
Level of Service					A						B	
Approach Delay (s)		0.0			2.6			0.0			15.2	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	5.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	42.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↳			↰↑↑↑				
Volume (vph)	0	0	0	0	1438	76	185	650	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4648			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4648			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1546	84	199	699	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	13	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1617	0	0	894	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type								Prot				
Protected Phases					1			2				
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1962			2305				
v/s Ratio Prot					c0.35							
v/s Ratio Perm								c0.15				
v/c Ratio					0.82			0.39				
Uniform Delay, d1					11.5			9.9				
Progression Factor					1.00			1.71				
Incremental Delay, d2					4.1			0.5				
Delay (s)					15.6			17.4				
Level of Service					B			B				
Approach Delay (s)		0.0			15.6			17.4			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	49.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St 5/23/2007

Movement	SBL	SBT	SER	SEL	SET	SER
Lane Configurations		↕↑↑		↰	↑↑↑↳	
Volume (vph)	58	652	28	292	88	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Total Lost time (s)		5.0	5.0	5.0		
Lane Util. Factor		0.91	1.00	0.91		
Frpb, ped/bikes		1.00	1.00	0.98		
Flpb, ped/bikes		0.99	1.00	1.00		
Frt		1.00	1.00	0.97		
Flt Protected		1.00	0.95	1.00		
Satd. Flow (prot)		4787	1548	4483		
Flt Permitted		1.00	0.95	1.00		
Satd. Flow (perm)		4787	1548	4483		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	63	709	28	317	96	
RTOR Reduction (vph)	0	0	0	54	0	
Lane Group Flow (vph)	0	772	28	359	0	
Confl. Peds. (#/hr)	70				70	
Confl. Bikes (#/hr)					16	
Heavy Vehicles (%)	2%	2%	2%	6%	2%	
Parking (#/hr)		10	5	5		
Turn Type	Perm		custom			
Protected Phases		2	1	1		
Permitted Phases	2		1			
Actuated Green, G (s)		17.0	18.0	18.0		
Effective Green, g (s)		17.0	18.0	18.0		
Actuated g/C Ratio		0.38	0.40	0.40		
Clearance Time (s)		5.0	5.0	5.0		
Lane Grp Cap (vph)		1808	619	1793		
v/s Ratio Prot			0.02	c0.08		
v/s Ratio Perm		0.16				
v/c Ratio		0.43	0.05	0.20		
Uniform Delay, d1		10.4	8.2	8.8		
Progression Factor		1.27	1.00	1.00		
Incremental Delay, d2		0.7	0.1	0.3		
Delay (s)		13.9	8.4	9.1		
Level of Service		B	A	A		
Approach Delay (s)		13.9		9.0		
Approach LOS		B		A		

Intersection Summary					
HCM Average Control Delay	12.1	HCM Level of Service	B		
HCM Volume to Capacity ratio	0.31				
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑						↕↑↑↳	
Volume (vph)	0	0	0	84	302	0	0	0	0	98	694	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						0.99	
Satd. Flow (prot)					3194						4709	
Flt Permitted					0.99						0.99	
Satd. Flow (perm)					3194						4709	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	91	328	0	0	0	0	107	754	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	0	419	0	0	0	0	0	907	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1136						2407	
v/s Ratio Prot												
v/s Ratio Perm					0.13						0.19	
v/c Ratio					0.37						0.38	
Uniform Delay, d1					10.8						6.7	
Progression Factor					1.01						0.30	
Incremental Delay, d2					0.9						0.4	
Delay (s)					11.7						2.4	
Level of Service					B						A	
Approach Delay (s)		0.0			11.7			0.0			2.4	
Approach LOS		A			B			A			A	

Intersection Summary					
HCM Average Control Delay	5.3	HCM Level of Service	A		
HCM Volume to Capacity ratio	0.37				
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↳			↰↑↑↳				
Volume (vph)	6	56	0	0	212	78	104	706	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3281			1535			5071				
Flt Permitted		0.91			1.00			0.99				
Satd. Flow (perm)		3021			1535			5071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	61	0	0	230	85	113	767	100	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	70	0	0	286	0	0	937	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1007			512			2919				
v/s Ratio Prot					c0.19							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.07			0.56			0.32				
Uniform Delay, d1		10.2			12.3			7.0				
Progression Factor		1.85			1.00			0.76				
Incremental Delay, d2		0.1			4.3			0.3				
Delay (s)		19.1			16.6			5.5				
Level of Service		B			B			A				
Approach Delay (s)		19.1			16.6			5.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary					
HCM Average Control Delay	8.8	HCM Level of Service	A		
HCM Volume to Capacity ratio	0.42				
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↳	
Volume (vph)	0	0	0	146	513	0	0	0	0	0	826	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6025						4741	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6025						4741	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	159	558	0	0	0	0	0	898	86
RTOR Reduction (vph)	0	0	0	0	52	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	665	0	0	0	0	0	959	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2276						2212	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.43	
Uniform Delay, d1					9.8						8.0	
Progression Factor					1.21						0.81	
Incremental Delay, d2					0.3						0.6	
Delay (s)					12.2						7.1	
Level of Service					B						A	
Approach Delay (s)		0.0			12.2			0.0			7.1	
Approach LOS		A			B			A			A	

Intersection Summary					
HCM Average Control Delay	9.3	HCM Level of Service	A		
HCM Volume to Capacity ratio	0.37				
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	0	0	944	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.72	0.88	0.88	0.92	0.92
Hourly flow rate (vph)	36	0	0	959	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	310		0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310		0			
tC, single (s)	6.9		4.1			
tC, 2 stage (s)						
tF (s)	3.6		2.2			
p0 queue free %	94		100			
cM capacity (veh/h)	647		1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	36	240	240	240	240
Volume Left	36	0	0	0	0
Volume Right	0	0	0	0	0
cSH	647	1700	1700	1700	1700
Volume to Capacity	0.06	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	472	86	185	990	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.98			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5959			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5959			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	513	93	201	1076	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	21	0	0	75	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	585	0	0	1202	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2384			2563				
v/s Ratio Prot					c0.10							
v/s Ratio Perm								0.20				
v/c Ratio					0.25			0.47				
Uniform Delay, d1					9.0			9.4				
Progression Factor					1.00			2.18				
Incremental Delay, d2					0.2			0.4				
Delay (s)					9.2			20.8				
Level of Service					A			C				
Approach Delay (s)		0.0			9.2			20.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	38.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑									↑↑↑↑	
Volume (vph)	0	591	356	0	0	0	0	0	0	236	745	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.94									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5676									4713	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5676									4713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	642	387	0	0	0	0	0	0	257	810	0
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	98	0
Lane Group Flow (vph)	0	988	0	0	0	0	0	0	0	0	969	0
Confl. Peds. (#/hr)					70					70		
Confl. Bikes (#/hr)					16							
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2523									1885	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.21	
v/c Ratio		0.39									0.51	
Uniform Delay, d1		8.4									10.2	
Progression Factor		1.00									2.30	
Incremental Delay, d2		0.5									0.9	
Delay (s)		8.9									24.4	
Level of Service		A									C	
Approach Delay (s)		8.9			0.0			0.0			24.4	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	16.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑						↑↑↑↑				
Volume (vph)	132	675	0	0	0	0	0	1106	283	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6065						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6065						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	734	0	0	0	0	0	1202	308	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	58	0	0	0	0
Lane Group Flow (vph)	0	866	0	0	0	0	0	1452	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2426						1846				
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.14										
v/c Ratio		0.36						0.79				
Uniform Delay, d1		9.4						11.8				
Progression Factor		1.05						1.00				
Incremental Delay, d2		0.4						3.5				
Delay (s)		10.3						15.3				
Level of Service		B						B				
Approach Delay (s)		10.3			0.0			15.3			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
52: Lakeshore & 1st Ave #2 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑	↑↑	↱
Volume (vph)	10	10	10	388	1682	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.92			1.00	1.00	0.89
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1553			3405	3406	1099
Flt Permitted	0.98			0.90	1.00	1.00
Satd. Flow (perm)	1553			3066	3406	1099
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	422	1828	11
RTOR Reduction (vph)	10	0	0	0	0	2
Lane Group Flow (vph)	12	0	0	433	1828	9
Confl. Peds. (#/hr)	70			70		
Confl. Bikes (#/hr)				16		
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	5.6			76.4	76.4	76.4
Effective Green, g (s)	5.6			76.4	76.4	76.4
Actuated g/C Ratio	0.06			0.85	0.85	0.85
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	97			2603	2891	933
v/s Ratio Prot	c0.01				c0.54	
v/s Ratio Perm				0.14		0.01
v/c Ratio	0.12			0.17	0.63	0.01
Uniform Delay, d1	39.9			1.2	2.2	1.0
Progression Factor	1.00			0.28	0.31	0.30
Incremental Delay, d2	0.2			0.0	0.8	0.0
Delay (s)	40.1			0.3	1.5	0.3
Level of Service	D			A	A	A
Approach Delay (s)	40.1			0.3	1.5	
Approach LOS	D			A	A	

Intersection Summary				
HCM Average Control Delay	1.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
53: 12th St #1#2 & Convention Ctr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑		↱
Volume (vph)	777	254	0	2420	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	0.95			1.00		0.81
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.96			1.00		0.88
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4501			4893		1304
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4501			4893		1304
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	845	276	0	2630	0	11
RTOR Reduction (vph)	33	0	0	0	0	10
Lane Group Flow (vph)	1088	0	0	2630	0	1
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	77.9			77.9		4.1
Effective Green, g (s)	77.9			77.9		4.1
Actuated g/C Ratio	0.87			0.87		0.05
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3898			4235		59
v/s Ratio Prot	0.24			c0.54		
v/s Ratio Perm						c0.00
v/c Ratio	0.28			0.62		0.01
Uniform Delay, d1	1.1			1.8		41.0
Progression Factor	0.59			0.47		1.00
Incremental Delay, d2	0.2			0.5		0.0
Delay (s)	0.8			1.4		41.0
Level of Service	A			A		D
Approach Delay (s)	0.8			1.4	41.0	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	1.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱↱↱	↰↰	↑↑	↑↑↑	
Volume (vph)	0	350	1416	1004	681	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	380	1539	1091	740	0
RTOR Reduction (vph)	0	17	0	0	0	0
Lane Group Flow (vph)	0	363	1539	1091	740	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		59.0	59.0	90.0	23.0	
Effective Green, g (s)		59.0	59.0	90.0	23.0	
Actuated g/C Ratio		0.66	0.66	1.00	0.26	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2277	2207	3254	1275	
v/s Ratio Prot		0.10	c0.46	0.34	c0.15	
v/s Ratio Perm						
v/c Ratio		0.16	0.70	0.34	0.58	
Uniform Delay, d1		6.0	9.8	0.0	29.3	
Progression Factor		1.00	0.62	1.00	0.90	
Incremental Delay, d2		0.0	0.6	0.2	1.9	
Delay (s)		6.0	6.7	0.2	28.3	
Level of Service		A	A	A	C	
Approach Delay (s)	6.0			4.0	28.3	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱↱↱		↑↑	↑↑	
Volume (vph)	0	361	0	1004	320	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.72		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		2614		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		2614		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	392	0	1091	348	0
RTOR Reduction (vph)	0	362	0	0	0	0
Lane Group Flow (vph)	0	30	0	1091	348	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		6.8		75.2	75.2	
Effective Green, g (s)		6.8		75.2	75.2	
Actuated g/C Ratio		0.08		0.84	0.84	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		198		2900	2719	
v/s Ratio Prot				c0.31	0.11	
v/s Ratio Perm		c0.01				
v/c Ratio		0.15		0.38	0.13	
Uniform Delay, d1		38.9		1.8	1.4	
Progression Factor		1.00		0.37	0.53	
Incremental Delay, d2		0.1		0.4	0.1	
Delay (s)		39.0		1.0	0.8	
Level of Service		D		A	A	
Approach Delay (s)	39.0			1.0	0.8	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Santa Clara Av & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	268	603	605	290	206	389	180	51	563	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1621	1441	1735	3539	1286	1610	2943			3515	1297
Flt Permitted		0.32	1.00	0.64	1.00	1.00	0.95	0.93			0.84	1.00
Satd. Flow (perm)		533	1441	1174	3539	1286	1610	2753			2975	1297
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	95	11	295	678	680	326	222	418	194	55	605	342
RTOR Reduction (vph)	0	11	186	0	0	146	0	50	0	0	0	48
Lane Group Flow (vph)	0	125	80	678	680	180	200	564	0	0	660	294
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		160	432	352	1062	386	242	1680			1207	526
v/s Ratio Prot					0.19		c0.12	0.05				
v/s Ratio Perm		0.23	0.06	c0.58		0.14		0.16			0.22	c0.23
v/c Ratio		0.78	0.18	1.93	0.64	0.47	0.83	0.35			0.55	0.56
Uniform Delay, d1		26.8	23.3	31.5	27.3	25.6	37.1	9.1			20.4	20.6
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.82	2.45			1.00	1.00
Incremental Delay, d2		30.5	0.9	427.1	3.0	4.0	24.4	0.5			1.8	4.2
Delay (s)		57.3	24.3	458.6	30.3	29.7	54.7	22.8			22.2	24.8
Level of Service		E	C	F	C	C	D	C			C	C
Approach Delay (s)		36.1			202.6			30.5			23.1	
Approach LOS		D			F			C			C	

Intersection Summary				
HCM Average Control Delay	103.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.09			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	110.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
2: MacArthur Blvd & Grand Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	553	339	0	0	0	0	347	1258	625	724	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4487						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4487						3539	1296	1770	3318	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	302	614	377	0	0	0	0	365	1324	702	813	0
RTOR Reduction (vph)	0	83	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1210	0	0	0	0	0	365	1324	702	813	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1496						1003	1296	423	1880	
v/s Ratio Prot								0.10		c0.40		
v/s Ratio Perm		0.27							c1.02		0.25	
v/c Ratio		0.81						0.36	1.02	1.66	0.43	
Uniform Delay, d1		27.4						25.8	45.0	34.2	11.2	
Progression Factor		1.00						1.00	1.00	1.22	1.15	
Incremental Delay, d2		4.8						1.0	30.6	297.8	0.1	
Delay (s)		32.2						26.8	75.6	339.6	12.9	
Level of Service		C						C	E	F	B	
Approach Delay (s)		32.2			0.0			65.0			164.3	
Approach LOS		C			A			E			F	

Intersection Summary				
HCM Average Control Delay	89.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.18			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	85.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	0	173	159	796	270	393	354	0	0	166	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.67			1.00	0.90	1.00	1.00			0.80	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.91	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	881			3510	1245	1770	3539			2405	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	881			3510	1245	1770	3539			2405	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	87	0	204	171	856	290	468	421	0	0	187	312
RTOR Reduction (vph)	0	192	0	0	0	129	0	0	0	0	99	0
Lane Group Flow (vph)	78	21	0	0	1027	161	468	421	0	0	400	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)			5			5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	6.0	6.0			36.5	36.5	20.0	51.0			27.0	
Effective Green, g (s)	6.0	6.0			36.5	36.5	20.0	51.0			27.0	
Actuated g/C Ratio	0.06	0.06			0.35	0.35	0.19	0.49			0.26	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Grp Cap (vph)	96	50			1220	433	337	1719			618	
v/s Ratio Prot	c0.05	0.02			c0.29		c0.26	0.12			c0.17	
v/s Ratio Perm						0.13						
v/c Ratio	0.81	0.41			0.84	0.37	1.39	0.24			0.65	
Uniform Delay, d1	48.9	47.8			31.6	25.7	42.5	15.8			34.8	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	50.7	23.3			7.1	2.5	192.3	0.3			5.2	
Delay (s)	99.7	71.1			38.7	28.1	234.8	16.1			39.9	
Level of Service	F	E			D	C	F	B			D	
Approach Delay (s)		78.8			36.4			131.2			39.9	
Approach LOS		E			D			F			D	

Intersection Summary				
HCM Average Control Delay	69.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	94.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
6: MacArthur Blvd & Lakeshore Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	348	1509	553	0	0	0	0	362	510	479	114	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Util. Factor	0.86	0.86						0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99						0.93		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.96						0.91		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	1.00	
Satd. Flow (prot)	1411	4548						2814		1770	3539	
Flt Permitted	0.95	1.00						1.00		0.17	1.00	
Satd. Flow (perm)	1411	4548						2814		320	3539	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	370	1605	588	0	0	0	0	381	537	544	130	0
RTOR Reduction (vph)	0	72	0	0	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	333	2156	0	0	0	0	0	912	0	544	130	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1415						1188		374	2084	
v/s Ratio Prot								0.32		c0.19	0.04	
v/s Ratio Perm	0.24	0.47								c0.67		
v/c Ratio	0.76	1.53						0.96dr		1.45	0.06	
Uniform Delay, d1	28.0	31.0						22.2		17.9	7.9	
Progression Factor	1.06	1.04						1.00		1.00	1.00	
Incremental Delay, d2	1.1	236.7						4.8		218.9	0.1	
Delay (s)	30.9	269.1						27.0		236.8	8.0	
Level of Service	C	F						C		F	A	
Approach Delay (s)		238.2			0.0			27.0			192.7	
Approach LOS		F			A			C			F	

Intersection Summary				
HCM Average Control Delay	184.1	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.46			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	103.8%	ICU Level of Service	G	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
9: Boden Way & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	24	645	0	12	643
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.57	0.57	0.91	0.91	0.94	0.94
Hourly flow rate (vph)	2	42	709	0	13	684
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			1078
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1517	742			738	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1520	634			629	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	90			98	
cM capacity (veh/h)	103	408			814	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	44	709	13	684
Volume Left	2	0	13	0
Volume Right	42	0	0	0
cSH	365	1700	814	1700
Volume to Capacity	0.12	0.42	0.02	0.40
Queue Length 95th (ft)	10	0	1	0
Control Delay (s)	16.2	0.0	9.5	0.0
Lane LOS	C		A	
Approach Delay (s)	16.2	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Wesley Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	4	600	10	20	634
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.50	0.90	0.90	0.88	0.88
Hourly flow rate (vph)	10	8	667	11	23	720
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.78	0.72			0.72	
vC, conflicting volume	1455	685			689	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1122	375			380	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			97	
cM capacity (veh/h)	170	481			846	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	678	23	720
Volume Left	10	0	23	0
Volume Right	8	11	0	0
cSH	239	1700	846	1700
Volume to Capacity	0.08	0.40	0.03	0.42
Queue Length 95th (ft)	6	0	2	0
Control Delay (s)	21.3	0.0	9.4	0.0
Lane LOS	C		A	
Approach Delay (s)	21.3	0.0	0.3	
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: E 16th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	22	1132	11	0	1200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	1230	12	0	1304
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.85	0.88			0.88	
vC, conflicting volume	1959	761			1312	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1135	450			1078	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	157	433			531	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	820	422	652	652
Volume Left	0	0	0	0	0
Volume Right	24	0	12	0	0
cSH	433	1700	1700	1700	1700
Volume to Capacity	0.06	0.48	0.25	0.38	0.38
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	13.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
20: Foothill Blvd #2 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	25	249	12	53	131	0	0	16	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	28	283	14	60	149	0	0	20	35
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	298			15			294	369	15	422	363	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	298			15			294	369	15	422	363	184
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	72	100	100	96	96
cM capacity (veh/h)	1260			1581			570	541	1047	397	546	826

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	170	155	209	56
Volume Left	28	0	60	0
Volume Right	0	14	0	35
cSH	1581	1700	549	696
Volume to Capacity	0.02	0.09	0.38	0.08
Queue Length 95th (ft)	1	0	44	7
Control Delay (s)	1.3	0.0	15.5	10.6
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.5	10.6
Approach LOS			C	B

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	646	0	0	643
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.95	0.95
Adj. Flow (vph)	0	0	709	0	0	677
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	709	0	0	677
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.43			0.42
v/s Ratio Perm						
v/c Ratio			0.52			0.49
Uniform Delay, d1			2.6			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.1
Delay (s)			2.7			2.6
Level of Service			A			A
Approach Delay (s)	0.0		2.7			2.6
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	2.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.4	Sum of lost time (s)	18.8
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	29	113	576	73	59	644
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.87		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1251		1577		1770	1863
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1251		1577		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	123	626	79	64	591
RTOR Reduction (vph)	107	0	7	0	0	0
Lane Group Flow (vph)	48	0	698	0	64	591
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.4		23.2		1.8	29.0
Effective Green, g (s)	5.4		23.2		1.8	29.0
Actuated g/C Ratio	0.13		0.57		0.04	0.72
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	167		906		79	1337
v/s Ratio Prot	c0.04		c0.44		c0.04	0.32
v/s Ratio Perm						
v/c Ratio	0.29		0.77		0.81	0.44
Uniform Delay, d1	15.8		6.6		19.1	2.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		3.7		42.7	0.1
Delay (s)	16.1		10.3		61.8	2.4
Level of Service	B		B		E	A
Approach Delay (s)	16.1		10.3			8.2
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	40.4	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	29	61	597	88	129	554
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.94		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.98		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1365		1585		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1365		1585		1770	1630
Peak-hour factor, PHF	0.90	0.90	0.93	0.93	0.91	0.91
Adj. Flow (vph)	32	68	642	95	142	609
RTOR Reduction (vph)	51	0	7	0	0	0
Lane Group Flow (vph)	49	0	730	0	142	609
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		42.0		7.0	53.0
Effective Green, g (s)	20.0		42.0		7.0	53.0
Actuated g/C Ratio	0.25		0.52		0.09	0.66
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	341		832		155	1080
v/s Ratio Prot	c0.04		c0.46		c0.08	0.37
v/s Ratio Perm						
v/c Ratio	0.14		0.88		0.92	0.56
Uniform Delay, d1	23.3		16.7		36.2	7.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.9		12.6		52.8	2.1
Delay (s)	24.2		29.4		89.1	9.4
Level of Service	C		C		F	A
Approach Delay (s)	24.2		29.4			24.5
Approach LOS	C		C			C

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Volume (vph)	469	43	532	652	135	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3360		2954		1770	3539
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3360		2954		1770	3539
Peak-hour factor, PHF	0.90	0.90	0.88	0.88	0.91	0.91
Adj. Flow (vph)	521	48	605	741	148	585
RTOR Reduction (vph)	13	0	296	0	0	0
Lane Group Flow (vph)	556	0	1050	0	148	585
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	14.2		25.2		6.1	34.3
Effective Green, g (s)	14.2		25.2		6.1	34.3
Actuated g/C Ratio	0.26		0.46		0.11	0.63
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	875		1366		198	2227
v/s Ratio Prot	c0.17		c0.36		c0.08	
v/s Ratio Perm						0.17
v/c Ratio	0.64		0.77		0.75	0.26
Uniform Delay, d1	17.9		12.2		23.5	4.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.1		4.2		12.6	0.0
Delay (s)	19.0		16.4		36.0	4.5
Level of Service	B		B		D	A
Approach Delay (s)	19.0		16.4			10.9
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Foothill Blvd #2 & Lakeshore Av #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	199	113	1118	0	0	1001
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3164		3235			3235
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3164		3235			3235
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	214	122	1202	0	0	1088
RTOR Reduction (vph)	48	0	0	0	0	0
Lane Group Flow (vph)	288	0	1202	0	0	1088
Confl. Peds. (#/hr)		42				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Parking (#/hr)			0			0
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	18.5		35.0			35.0
Effective Green, g (s)	18.5		35.0			35.0
Actuated g/C Ratio	0.31		0.58			0.58
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	976		1887			1887
v/s Ratio Prot	c0.09		c0.37			0.34
v/s Ratio Perm						
v/c Ratio	0.29		0.64			0.58
Uniform Delay, d1	15.8		8.3			7.8
Progression Factor	1.00		0.43			1.00
Incremental Delay, d2	0.8		1.5			1.3
Delay (s)	16.6		5.1			9.1
Level of Service	B		A			A
Approach Delay (s)	16.6		5.1			9.1
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: E 15th St & 1st Ave #2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1138	219	232	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3303			3395
Flt Permitted			1.00			0.52
Satd. Flow (perm)			3303			1777
Peak-hour factor, PHF	0.92	0.92	0.86	0.86	0.92	0.92
Adj. Flow (vph)	0	0	1323	255	252	1082
RTOR Reduction (vph)	0	0	10	0	0	0
Lane Group Flow (vph)	0	0	1568	0	0	1334
Confl. Peds. (#/hr)				26	70	
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type				pm+pt		
Protected Phases			2	1 4		6
Permitted Phases				6		
Actuated Green, G (s)			47.5			52.0
Effective Green, g (s)			47.5			52.0
Actuated g/C Ratio			0.79			0.87
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2615			1881
v/s Ratio Prot			0.47			c0.06
v/s Ratio Perm						c0.64
v/c Ratio			0.60			0.80
Uniform Delay, d1			2.5			1.8
Progression Factor			0.36			6.77
Incremental Delay, d2			0.9			2.5
Delay (s)			1.8			14.4
Level of Service			A			B
Approach Delay (s)	0.0		1.8			14.4
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: International Blvd & 1st Ave #1#2 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	267	71	1261	572	10	995
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.98		1.00	0.94		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3233		3406	2574		3405
Flt Permitted	0.96		1.00	1.00		0.94
Satd. Flow (perm)	3233		3406	2574		3200
Peak-hour factor, PHF	0.90	0.90	0.91	0.91	0.92	0.92
Adj. Flow (vph)	297	79	1386	629	11	1082
RTOR Reduction (vph)	13	0	0	220	0	0
Lane Group Flow (vph)	363	0	1386	409	0	1093
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	13.0		39.0	39.0		39.0
Effective Green, g (s)	13.0		39.0	39.0		39.0
Actuated g/C Ratio	0.22		0.65	0.65		0.65
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	700		2214	1673		2080
v/s Ratio Prot	c0.11		c0.41			
v/s Ratio Perm				0.16		0.34
v/c Ratio	0.52		0.63	0.24		0.53
Uniform Delay, d1	20.7		6.2	4.4		5.6
Progression Factor	1.00		1.00	1.00		0.96
Incremental Delay, d2	0.3		1.4	0.3		0.6
Delay (s)	21.0		7.5	4.7		6.0
Level of Service	C		A	A		A
Approach Delay (s)	21.0		6.7			6.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Driveway & 1st Ave #1#2 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	0	20	151	0	6	0	1546	934	5	1262	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.93			1.00	0.98		0.95		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.93			1.00	0.98		0.94		1.00	1.00	
Flt Protected		0.98			0.95	0.96		1.00		0.95	1.00	
Satd. Flow (prot)		1576			3221	1569		5429		1765	4887	
Flt Permitted		0.98			0.95	0.96		1.00		0.95	1.00	
Satd. Flow (perm)		1576			3221	1569		5429		1765	4887	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	0	22	164	0	7	0	1680	1015	5	1372	5
RTOR Reduction (vph)	0	21	0	0	5	0	0	49	0	0	0	0
Lane Group Flow (vph)	0	23	0	115	51	0	0	2646	0	5	1377	0
Confl. Peds. (#/hr)	70		70	70		70			70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)								5				
Turn Type	Split			Split						Prot		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		6.8			10.2	10.2		69.1		0.6	73.7	
Effective Green, g (s)		6.8			10.2	10.2		69.1		0.6	73.7	
Actuated g/C Ratio		0.07			0.10	0.10		0.67		0.01	0.72	
Clearance Time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		104			320	156		3653		10	3507	
v/s Ratio Prot		c0.01			c0.04	0.03		c0.49		0.00	c0.28	
v/s Ratio Perm												
v/c Ratio		0.23			0.36	0.33		1.04dr		0.50	0.39	
Uniform Delay, d1		45.5			43.2	43.1		10.7		50.9	5.7	
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2		0.4			0.3	0.5		1.3		13.6	0.0	
Delay (s)		45.9			43.5	43.5		12.0		64.5	5.7	
Level of Service		D			D	D		B		E	A	
Approach Delay (s)		45.9				43.5		12.0			5.9	
Approach LOS		D				D		B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
21: E 15th St #1 & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	401	30	0	0	0	0	207	12	7	32	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	31	441	33	0	0	0	0	262	15	9	40	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.93			0.93	0.93	0.93	0.93	0.93	
vC, conflicting volume	4			480			544	529	248	437	545	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			275			345	328	25	229	346	4
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	51	98	98	92	100
cM capacity (veh/h)	1611			1182			496	530	962	384	518	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	251	253	277	48
Volume Left	31	0	0	9
Volume Right	0	33	15	0
cSH	1611	1700	543	488
Volume to Capacity	0.02	0.15	0.51	0.10
Queue Length 95th (ft)	1	0	72	8
Control Delay (s)	1.0	0.0	18.3	13.2
Lane LOS	A		C	B
Approach Delay (s)	0.5		18.3	13.2
Approach LOS			C	B

Intersection Summary				
Average Delay			7.2	
Intersection Capacity Utilization			31.6%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
24: E. 10th St & 2nd Ave 5/23/2007

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	48	268	188	36	40	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	291	204	39	43	35
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	313				760	364
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	313				760	364
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				86	94
cM capacity (veh/h)	1174				317	604

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	343	243	78
Volume Left	52	0	43
Volume Right	0	39	35
cSH	1174	1700	402
Volume to Capacity	0.04	0.14	0.19
Queue Length 95th (ft)	3	0	18
Control Delay (s)	1.6	0.0	16.1
Lane LOS	A		C
Approach Delay (s)	1.6	0.0	16.1
Approach LOS			C

Intersection Summary				
Average Delay			2.7	
Intersection Capacity Utilization			52.7%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
29: Embarcadero & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	430	2	2	184	381	1	2	1	314	2	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	467	2	2	200	414	1	2	1	341	2	49

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total (vph)	513	202	414	4	343	49
Volume Left (vph)	43	2	0	1	341	0
Volume Right (vph)	2	0	414	1	0	49
Hadj (s)	0.05	0.04	-0.67	-0.07	0.53	-0.67
Departure Headway (s)	7.0	7.2	6.5	9.3	8.1	6.9
Degree Utilization, x	1.00	0.41	0.75	0.01	0.77	0.09
Capacity (veh/h)	506	499	552	353	343	513
Control Delay (s)	67.4	13.9	25.0	12.4	32.7	9.4
Approach Delay (s)	67.4	21.4		12.4	29.8	
Approach LOS	F	C		B	D	

Intersection Summary				
Delay			39.0	
HCM Level of Service			E	
Intersection Capacity Utilization			75.9%	ICU Level of Service D
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
37: 17th St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	67	0	0	807	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.91	0.91	0.92	0.92
Hourly flow rate (vph)	116	0	0	887	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	513	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	100	100			
cM capacity (veh/h)	490	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	58	58	443	443
Volume Left	58	58	0	0
Volume Right	0	0	0	0
cSH	490	490	1700	1700
Volume to Capacity	0.12	0.12	0.26	0.26
Queue Length 95th (ft)	10	10	0	0
Control Delay (s)	13.3	13.3	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.3		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay			1.5	
Intersection Capacity Utilization			65.1%	ICU Level of Service C
Analysis Period (min)			15	

HCM Signalized Intersection Capacity Analysis
22: International Blvd & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	71	432	56	47	134	8	145	237	56	6	34	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.97			1.00	
Frt		0.98			0.99			0.98			0.94	
Flt Protected		0.99			0.99			0.98			1.00	
Satd. Flow (prot)		3155			3183			1511			1445	
Flt Permitted		0.88			0.73			0.87			0.97	
Satd. Flow (perm)		2802			2363			1338			1409	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	470	61	51	146	9	158	258	61	7	37	36
RTOR Reduction (vph)	0	24	0	0	6	0	0	3	0	0	13	0
Lane Group Flow (vph)	0	584	0	0	200	0	0	474	0	0	67	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		23.6			23.6			50.4			50.4	
Effective Green, g (s)		23.6			23.6			50.4			50.4	
Actuated g/C Ratio		0.30			0.30			0.63			0.63	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		827			697			843			888	
v/s Ratio Prot												
v/s Ratio Perm		c0.21			0.08			c0.35			0.05	
v/c Ratio		0.71			0.29			0.56			0.08	
Uniform Delay, d1		25.1			21.7			8.5			5.7	
Progression Factor		1.00			1.00			1.00			1.10	
Incremental Delay, d2		2.3			0.1			2.7			0.2	
Delay (s)		27.4			21.8			11.2			6.5	
Level of Service		C			C			B			A	
Approach Delay (s)		27.4			21.8			11.2			6.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: E. 12TH & 2nd Ave 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	374	750	10	20	131	67	6	62	8	106	61	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		1.00			0.92			0.98			1.00	0.86
Flpb, ped/bikes		0.95			1.00			0.99			0.93	1.00
Frt		1.00			0.95			0.99			1.00	0.85
Flt Protected		0.98			1.00			1.00			0.97	1.00
Satd. Flow (prot)		3079			3098			1563			1687	1362
Flt Permitted		0.75			0.84			0.97			0.79	1.00
Satd. Flow (perm)		2360			2605			1525			1366	1362
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	407	815	11	22	142	73	7	67	9	115	66	22
RTOR Reduction (vph)	0	1	0	0	25	0	0	5	0	0	0	15
Lane Group Flow (vph)	0	1232	0	0	212	0	0	78	0	0	181	7
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5				5		5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		59.5			59.5			21.0			21.0	21.0
Effective Green, g (s)		59.5			59.5			21.0			21.0	21.0
Actuated g/C Ratio		0.66			0.66			0.23			0.23	0.23
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1560			1722			356			319	318
v/s Ratio Prot												
v/s Ratio Perm		c0.52			0.08			0.05			c0.13	0.01
v/c Ratio		0.79			0.12			0.22			0.57	0.02
Uniform Delay, d1		10.8			5.6			27.9			30.5	26.6
Progression Factor		1.00			1.00			1.02			1.00	1.00
Incremental Delay, d2		4.2			0.1			1.4			7.1	0.1
Delay (s)		15.0			5.8			29.8			37.6	26.7
Level of Service		B			A			C			D	C
Approach Delay (s)		15.0			5.8			29.8			36.4	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Volume (vph)	0	0	0	46	278	44	38	261	0	0	134	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3202			1652			1642	
Flt Permitted					0.99			0.95			1.00	
Satd. Flow (perm)					3202			1587			1642	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	50	302	48	41	284	0	0	146	14
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	384	0	0	325	0	0	155	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1330			769			796	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.12			c0.20				
v/c Ratio					0.29			0.42			0.19	
Uniform Delay, d1					12.6			10.9			9.5	
Progression Factor					1.00			1.27			1.00	
Incremental Delay, d2					0.5			1.5			0.5	
Delay (s)					13.2			15.2			10.1	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.2			15.2			10.1	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
26: International Blvd & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	20	436	36	28	483	46	63	227	45	37	189	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.99			0.99			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3288			3277			1607			1636	
Flt Permitted		0.93			0.92			0.90			0.91	
Satd. Flow (perm)		3049			3017			1454			1502	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	474	39	30	525	50	68	247	49	40	205	17
RTOR Reduction (vph)	0	9	0	0	10	0	0	9	0	0	4	0
Lane Group Flow (vph)	0	526	0	0	595	0	0	355	0	0	258	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1384			1369			626			647	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.20			c0.24			0.17	
v/c Ratio		0.38			0.43			0.57			0.40	
Uniform Delay, d1		11.7			12.1			13.9			12.7	
Progression Factor		1.00			1.00			0.95			0.79	
Incremental Delay, d2		0.8			1.0			2.6			1.8	
Delay (s)		12.5			13.1			15.8			11.8	
Level of Service		B			B			B			B	
Approach Delay (s)		12.5			13.1			15.8			11.8	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
27: E 12th Street & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑			↑	
Volume (vph)	23	589	71	25	371	63	54	287	99	46	180	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3267			3236			1582			1618	
Flt Permitted		0.93			0.90			0.93			0.88	
Satd. Flow (perm)		3051			2932			1483			1434	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	640	77	27	403	68	59	312	108	50	196	30
RTOR Reduction (vph)	0	14	0	0	19	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	728	0	0	479	0	0	463	0	0	269	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1549			1489			570			552	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.16			c0.31			0.19	
v/c Ratio		0.47			0.32			0.81			0.49	
Uniform Delay, d1		10.3			9.4			17.9			15.1	
Progression Factor		1.00			1.00			0.80			0.72	
Incremental Delay, d2		1.0			0.6			10.7			2.9	
Delay (s)		11.4			10.0			25.1			13.8	
Level of Service		B			A			C			B	
Approach Delay (s)		11.4			10.0			25.1			13.8	
Approach LOS		B			A			C			B	

Intersection Summary				
HCM Average Control Delay	14.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	73.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
28: E. 8th St & 5th Av 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑			↑	
Volume (vph)	177	681	143	95	211	26	55	303	61	34	231	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.91		0.98	
Flpb, ped/bikes	0.94	1.00		0.98	1.00			0.99	1.00		1.00	
Frt	1.00	0.97		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		0.99	
Satd. Flow (prot)	1661	4690		1729	4773			1655	1448		1596	
Flt Permitted	0.59	1.00		0.25	1.00			0.91	1.00		0.94	
Satd. Flow (perm)	1025	4690		463	4773			1511	1448		1507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	192	740	155	38	229	28	60	329	66	37	251	64
RTOR Reduction (vph)	0	50	0	0	16	0	0	0	36	0	12	0
Lane Group Flow (vph)	192	845	0	38	241	0	0	389	30	0	340	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Effective Green, g (s)	28.0	28.0		28.0	28.0			30.0	30.0		30.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.46	0.46		0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	
Lane Grp Cap (vph)	442	2020		199	2056			697	668		696	
v/s Ratio Prot		0.18			0.05							
v/s Ratio Perm	c0.19			0.08				c0.26	0.02		0.23	
v/c Ratio	0.43	0.42		0.19	0.12			0.56	0.05		0.49	
Uniform Delay, d1	13.0	12.8		11.5	11.1			12.7	9.6		12.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.69	
Incremental Delay, d2	3.1	0.6		2.1	0.1			3.2	0.1		2.3	
Delay (s)	16.0	13.5		13.6	11.2			15.9	9.8		10.7	
Level of Service	B	B		B	B			B	A		B	
Approach Delay (s)		13.9			11.5			15.0			10.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	82.3%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations		↰↑	↑↑		↰	↑↑			↰	↔		
Volume (vph)	9	222	1056	57	144	446	49	75	179	304	141	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.91		
Flpb, ped/bikes		1.00	1.00		0.99	1.00			0.96	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.95		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3283		1757	3054			1544	2754		
Flt Permitted		0.95	1.00		0.23	1.00			0.54	0.93		
Satd. Flow (perm)		3433	3283		430	3054			872	2576		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	241	1148	62	157	485	53	82	195	330	153	17
RTOR Reduction (vph)	0	0	4	0	0	13	0	0	0	3	0	0
Lane Group Flow (vph)	0	251	1206	0	157	607	0	0	175	517	0	0
Confl. Peds. (#/hr)		70		70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	Prot	Prot			Perm				Perm			
Protected Phases	5	5	2			6				4		
Permitted Phases					6				4			
Actuated Green, G (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Effective Green, g (s)		19.0	51.0		27.0	27.0			29.0	29.0		
Actuated g/C Ratio		0.21	0.57		0.30	0.30			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		725	1860		129	916			281	830		
v/s Ratio Prot		0.07	c0.37			0.20						
v/s Ratio Perm					c0.37				0.20	c0.20		
v/c Ratio		0.35	0.65		1.22	0.66			0.62	0.62		
Uniform Delay, d1		30.2	13.4		31.5	27.5			25.9	25.9		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		1.3	1.8		149.0	3.8			10.0	3.5		
Delay (s)		31.5	15.1		180.5	31.3			35.8	29.4		
Level of Service		C	B		F	C			D	C		
Approach Delay (s)			17.9			61.4				31.0		
Approach LOS			B			E				C		

Intersection Summary				
HCM Average Control Delay	31.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	115.5%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
30: Harrison St & 27th St 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations			↔	
Volume (vph)	35	16	125	116
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.98	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3136	
Flt Permitted			0.77	
Satd. Flow (perm)			2438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	16	136	126
RTOR Reduction (vph)	0	0	35	0
Lane Group Flow (vph)	0	0	281	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			786	
v/s Ratio Prot				
v/s Ratio Perm			0.12	
v/c Ratio			0.36	
Uniform Delay, d1			23.4	
Progression Factor			1.00	
Incremental Delay, d2			1.3	
Delay (s)			24.6	
Level of Service			C	
Approach Delay (s)			24.6	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
31: Grand Av & Harrison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	474	149	246	330	30	0	1246	724	0	575	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3280		3400	3440			5036	1479		4696	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3280		3400	3440			5036	1479		4696	
Peak-hour factor, PHF	0.85	0.85	0.85	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88
Adj. Flow (vph)	152	558	175	293	393	36	0	1342	778	0	653	88
RTOR Reduction (vph)	0	34	0	0	7	0	0	0	388	0	18	0
Lane Group Flow (vph)	152	699	0	293	422	0	0	1342	390	0	723	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Effective Green, g (s)	8.3	23.1		24.2	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.09	0.26		0.27	0.45			0.29	0.29		0.29	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	323	858		932	1558			1483	435		1383	
v/s Ratio Prot	0.04	c0.21		c0.09	0.12			c0.27			0.16	
v/s Ratio Perm									0.26			
v/c Ratio	0.47	0.81		0.31	0.27			0.90	0.90		0.52	
Uniform Delay, d1	37.9	30.6		25.5	15.1			30.0	29.9		26.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	5.7		0.1	0.4			8.0	20.1		0.2	
Delay (s)	38.3	36.3		25.5	15.5			37.9	49.9		26.1	
Level of Service	D	D		C	B			D	D		C	
Approach Delay (s)		36.6			19.6			42.3			26.1	
Approach LOS		D			B			D			C	

Intersection Summary				
HCM Average Control Delay	34.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	104.1%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
32: 20th St #3 & Lakeside Dr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	921	170	583	429	100	850
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.98		1.00	1.00	0.92	0.90
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.88	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4719		3367	4893	2878	1296
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4719		3367	4893	2878	1296
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1001	185	634	466	109	924
RTOR Reduction (vph)	45	0	0	0	339	339
Lane Group Flow (vph)	1141	0	634	466	232	123
Confl. Peds. (#/hr)		70	70		70	70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	18.0		14.0	36.0	16.0	16.0
Effective Green, g (s)	18.0		14.0	36.0	16.0	16.0
Actuated g/C Ratio	0.30		0.23	0.60	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1416		786	2936	767	346
v/s Ratio Prot	c0.24		c0.19	0.10	0.08	
v/s Ratio Perm						c0.10
v/c Ratio	0.81		0.81	0.16	0.30	0.36
Uniform Delay, d1	19.4		21.7	5.3	17.6	17.8
Progression Factor	1.18		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4		8.7	0.1	1.0	2.8
Delay (s)	27.2		30.4	5.4	18.6	20.7
Level of Service	C		C	A	B	C
Approach Delay (s)	27.2			19.8	19.5	
Approach LOS	C			B	B	

Intersection Summary				
HCM Average Control Delay	22.4	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	69.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
33: 20th St #3 & Driveway 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	413	37	136	300	93	119	33	0	676	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00	0.86			0.95	0.93	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.85			0.90	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.98	1.00	1.00	1.00
Satd. Flow (prot)	4810		1770	3406	1364			1499	1438	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.98	1.00	1.00	1.00
Satd. Flow (perm)	4810		1770	3406	1364			1499	1438	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	40	148	326	101	129	36	0	737	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	107	256	0	0
Lane Group Flow (vph)	489	0	148	326	101	0	0	353	186	33	11
Confl. Peds. (#/hr)		70	70		70	70	70		70		
Confl. Bikes (#/hr)		16			16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5							5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	6			8		Free
Actuated Green, G (s)	17.0		7.0	20.0	20.0			24.0	24.0	4.0	60.0
Effective Green, g (s)	17.0		7.0	20.0	20.0			24.0	24.0	4.0	60.0
Actuated g/C Ratio	0.28		0.12	0.33	0.33			0.40	0.40	0.07	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	1363		207	1135	455			600	575	107	1611
v/s Ratio Prot	c0.10		c0.08	0.10				c0.24		0.02	
v/s Ratio Perm					0.07				0.13		0.01
v/c Ratio	0.36		0.71	0.29	0.22			0.59	0.32	0.31	0.01
Uniform Delay, d1	17.2		25.5	14.7	14.4			14.1	12.4	28.7	0.0
Progression Factor	1.00		0.84	0.72	0.73			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7		18.8	0.6	1.1			4.2	1.5	7.3	0.0
Delay (s)	17.9		40.2	11.3	11.6			18.3	13.9	34.0	0.0
Level of Service	B		D	B	B			B	B	C	A
Approach Delay (s)	17.9			18.8				16.1			
Approach LOS	B			B				B			

Intersection Summary				
HCM Average Control Delay	17.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	61.9%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	224	7	3	650	630	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1517			1630	1555	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1517			1626	1555	
Peak-hour factor, PHF	0.75	0.75	0.91	0.91	0.95	0.95
Adj. Flow (vph)	299	9	3	714	663	173
RTOR Reduction (vph)	2	0	0	0	17	0
Lane Group Flow (vph)	306	0	0	717	819	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	14.0			34.0	34.0	
Effective Green, g (s)	14.0			34.0	34.0	
Actuated g/C Ratio	0.25			0.62	0.62	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	386			1005	961	
v/s Ratio Prot	c0.20				c0.53	
v/s Ratio Perm				0.44		
v/c Ratio	0.79			0.71	0.85	
Uniform Delay, d1	19.1			7.2	8.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	15.3			4.3	9.4	
Delay (s)	34.4			11.5	17.9	
Level of Service	C			B	B	
Approach Delay (s)	34.4			11.5	17.9	
Approach LOS	C			B	B	

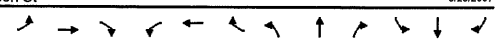
Intersection Summary				
HCM Average Control Delay	18.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	63.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & 19th St 5/23/2007

Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	591	11	0	0	0	0	106	660	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3318	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.84	0.84	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	704	13	0	0	0	0	113	702	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	717	0	0	0	0	0	113	702	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		33.5						20.0	60.0		
Effective Green, g (s)		33.5						20.0	56.5		
Actuated g/C Ratio		0.56						0.33	0.94		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		864						1106	1458		
v/s Ratio Prot		c0.46						0.03			
v/s Ratio Perm									c0.45		
v/c Ratio		0.83						0.10	0.48		
Uniform Delay, d1		10.9						13.8	0.2		
Progression Factor		1.00						0.64	1.00		
Incremental Delay, d2		9.1						0.2	1.1		
Delay (s)		20.0						9.0	1.3		
Level of Service		B						A	A		
Approach Delay (s)	20.0				0.0			2.4		0.0	
Approach LOS	B				A			A		A	

Intersection Summary				
HCM Average Control Delay	10.6	HCM Level of Service		B
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	47.3%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	42	197	0	0	0	0	0	0	45	690	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.88									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2737									4814	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2737									4814	
Peak-hour factor, PHF	0.79	0.79	0.79	0.92	0.92	0.92	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	53	249	0	0	0	0	0	0	53	812	0
RTOR Reduction (vph)	0	100	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	202	0	0	0	0	0	0	0	0	849	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			8									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		14.5									24.0	
Effective Green, g (s)		14.5									24.0	
Actuated g/C Ratio		0.32									0.53	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		882									2567	
v/s Ratio Prot		c0.07										
v/s Ratio Perm											0.18	
v/c Ratio		0.23									0.33	
Uniform Delay, d1		11.2									5.9	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									0.3	
Delay (s)		11.8									6.3	
Level of Service		B									A	
Approach Delay (s)		11.8			0.0			0.0			6.3	
Approach LOS		B			A			A			A	

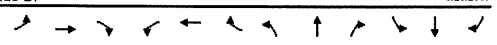
Intersection Summary				
HCM Average Control Delay	7.7	HCM Level of Service		A
HCM Volume to Capacity ratio	0.29			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	41.7%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	492	58	28	402	0	0	0	0	309	461	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.99	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3124			3241					1295	3103	
Flt Permitted		1.00			0.91					0.95	1.00	
Satd. Flow (perm)		3124			2944					1295	3103	
Peak-hour factor, PHF	0.89	0.89	0.89	0.83	0.83	0.83	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	553	65	34	484	0	0	0	0	336	501	35
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	598	0	0	518	0	0	0	0	286	576	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type				Perm						Perm		
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1458			1374					489	1172	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.18					c0.22	0.19	
v/c Ratio		0.41			0.38					0.58	0.49	
Uniform Delay, d1		7.9			7.8					11.2	10.7	
Progression Factor		1.00			1.00					1.71	1.77	
Incremental Delay, d2		0.9			0.8					4.9	1.4	
Delay (s)		8.8			8.6					23.9	20.4	
Level of Service		A			A					C	C	
Approach Delay (s)		8.8			8.6			0.0			21.5	
Approach LOS		A			A			A			C	

Intersection Summary				
HCM Average Control Delay	14.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	54.3%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
39: 14th St & Lakeside Dr 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	749	0	0	280	313	106	406	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.90		1.00				
Flpb, ped/bikes		1.00			1.00	1.00		0.98				
Frt		1.00			1.00	0.85		1.00				
Flt Protected		1.00			1.00	1.00		0.99				
Satd. Flow (prot)		3174			3471	1425		4674				
Flt Permitted		0.88			1.00	1.00		0.99				
Satd. Flow (perm)		2817			3471	1425		4674				
Peak-hour factor, PHF	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88	0.92	0.92	0.92
Adj. Flow (vph)	85	814	0	0	318	356	120	461	16	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	52	0	6	0	0	0	0
Lane Group Flow (vph)	0	899	0	0	318	304	0	591	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		37.9			37.9	37.9		13.6				
Effective Green, g (s)		37.9			37.9	37.9		13.6				
Actuated g/C Ratio		0.63			0.63	0.63		0.23				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1779			2193	900		1059				
v/s Ratio Prot					0.09							
v/s Ratio Perm		c0.32				0.21		0.13				
v/c Ratio		0.51			0.15	0.34		0.56				
Uniform Delay, d1		6.0			4.5	5.2		20.5				
Progression Factor		1.00			0.84	1.31		1.00				
Incremental Delay, d2		1.0			0.1	1.0		0.4				
Delay (s)		7.0			3.9	7.7		20.9				
Level of Service		A			A	A		C				
Approach Delay (s)		7.0			5.9			20.9			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service		B
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	77.7%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
40: 13th St & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Volume (vph)	0	614	162	0	0	0	0	0	0	96	620	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5883									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5883									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	667	176	0	0	0	0	0	0	104	674	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	788	0	0	0	0	0	0	0	0	732	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2745									1798	
v/s Ratio Prot		c0.13										
v/s Ratio Perm											0.15	
v/c Ratio		0.29									0.41	
Uniform Delay, d1		7.4									10.3	
Progression Factor		1.00									1.53	
Incremental Delay, d2		0.3									0.6	
Delay (s)		7.7									16.4	
Level of Service		A									B	
Approach Delay (s)		7.7			0.0			0.0			16.4	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	11.8	HCM Level of Service		B
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	41.2%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
41: 13th St & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Volume (vph)	70	608	0	0	0	0	0	465	291	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.93			
Flpb, ped/bikes	0.97	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1508	4873						4831	1474			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1508	4873						4831	1474			
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	81	707	0	0	0	0	0	505	316	0	0	0
RTOR Reduction (vph)	46	0	0	0	0	0	0	0	73	0	0	0
Lane Group Flow (vph)	35	707	0	0	0	0	0	505	243	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	653	2112						2040	622			
v/s Ratio Prot		c0.15						0.10				
v/s Ratio Perm	0.02								c0.16			
v/c Ratio	0.05	0.33						0.25	0.39			
Uniform Delay, d1	7.4	8.5						8.4	9.0			
Progression Factor	0.94	0.85						2.22	3.03			
Incremental Delay, d2	0.2	0.4						0.3	1.7			
Delay (s)	7.1	7.6						18.9	28.9			
Level of Service	A	A						B	C			
Approach Delay (s)		7.6			0.0			22.8			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		6.5
Intersection Capacity Utilization	62.6%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
42: 12th St #2 & Madison St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Volume (vph)	0	0	0	234	719	0	0	0	0	0	560	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5899						4735	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5899						4735	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	0	0	257	790	0	0	0	0	0	618	58
RTOR Reduction (vph)	0	0	0	0	67	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	0	0	0	980	0	0	0	0	0	652	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1789	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.17							
v/c Ratio					0.36						0.36	
Uniform Delay, d1					7.7						10.1	
Progression Factor					0.26						1.72	
Incremental Delay, d2					0.3						0.5	
Delay (s)					2.3						17.9	
Level of Service					A						B	
Approach Delay (s)		0.0			2.3			0.0			17.9	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	8.4	HCM Level of Service		A
HCM Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	33.1%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
43: 12th St #2 & Oak St
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑↑				
Volume (vph)	0	0	0	0	878	23	155	748	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					1.00			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4673			6032				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4673			6032				
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	976	26	167	804	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	30	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	996	0	0	941	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1973			2346				
v/s Ratio Prot					c0.21							
v/s Ratio Perm								c0.16				
v/c Ratio					0.50			0.40				
Uniform Delay, d1					9.5			10.0				
Progression Factor					1.00			1.72				
Incremental Delay, d2					0.9			0.5				
Delay (s)					10.5			17.6				
Level of Service					B			B				
Approach Delay (s)		0.0			10.5			17.6			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	14.0	HCM Level of Service		B
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.5
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
44: 11th St & Madison St 5/23/2007

Movement	SBL	SBT	SEL	SET	SER
Lane Configurations		↰↑↑	↰	↑↑↱	
Volume (vph)	52	774	42	958	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	
Lane Util. Factor		0.91	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	
Frt		1.00	1.00	0.98	
Flt Protected		1.00	0.95	1.00	
Satd. Flow (prot)		4796	1548	4580	
Flt Permitted		1.00	0.95	1.00	
Satd. Flow (perm)		4796	1548	4580	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	841	46	1041	146
RTOR Reduction (vph)	0	0	0	33	0
Lane Group Flow (vph)	0	898	46	1154	0
Confl. Peds. (#/hr)	70				70
Confl. Bikes (#/hr)					16
Heavy Vehicles (%)	2%	2%	2%	6%	2%
Parking (#/hr)		10	5	5	
Turn Type	Perm		custom		
Protected Phases		2	1	1	
Permitted Phases	2		1		
Actuated Green, G (s)		17.0	18.0	18.0	
Effective Green, g (s)		17.0	18.0	18.0	
Actuated g/C Ratio		0.38	0.40	0.40	
Clearance Time (s)		5.0	5.0	5.0	
Lane Grp Cap (vph)		1812	619	1832	
v/s Ratio Prot			0.03	c0.25	
v/s Ratio Perm		0.19			
v/c Ratio		0.50	0.07	0.63	
Uniform Delay, d1		10.7	8.3	10.8	
Progression Factor		1.07	1.00	1.00	
Incremental Delay, d2		0.9	0.2	1.7	
Delay (s)		12.4	8.6	12.5	
Level of Service		B	A	B	
Approach Delay (s)		12.4		12.3	
Approach LOS		B		B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: E. 10th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑						↰↑↑↱	
Volume (vph)	0	0	0	86	192	0	0	0	0	86	802	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	93	209	0	0	0	0	93	872	61
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	302	0	0	0	0	0	1010	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.10						0.21	
v/c Ratio					0.27						0.42	
Uniform Delay, d1					10.3						6.8	
Progression Factor					1.03						0.30	
Incremental Delay, d2					0.5						0.5	
Delay (s)					11.1						2.6	
Level of Service					B						A	
Approach Delay (s)		0.0			11.1			0.0			2.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: E. 10th St & Oak St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑			↱			↰↑↑↑↱				
Volume (vph)	2	60	0	0	208	100	88	734	74	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.97			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.99				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		3310			1516			6006				
Flt Permitted		0.95			1.00			1.00				
Satd. Flow (perm)		3138			1516			6006				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	65	0	0	226	109	96	798	80	0	0	0
RTOR Reduction (vph)	0	0	0	0	39	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	67	0	0	296	0	0	942	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1046			505			2936				
v/s Ratio Prot					c0.20							
v/s Ratio Perm		0.02						0.16				
v/c Ratio		0.06			0.59			0.32				
Uniform Delay, d1		10.2			12.4			7.0				
Progression Factor		1.88			1.00			0.89				
Incremental Delay, d2		0.1			4.9			0.3				
Delay (s)		19.3			17.4			6.5				
Level of Service		B			B			A				
Approach Delay (s)		19.3			17.4			6.5			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

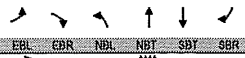
HCM Signalized Intersection Capacity Analysis
48: 8th St & Madison St 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↱	
Volume (vph)	0	0	0	125	431	0	0	0	0	0	909	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6023						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6023						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	136	468	0	0	0	0	0	988	117
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	564	0	0	0	0	0	1072	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2275						2204	
v/s Ratio Prot											c0.23	
v/s Ratio Perm					0.09							
v/c Ratio					0.25						0.49	
Uniform Delay, d1					9.6						8.3	
Progression Factor					1.12						0.78	
Incremental Delay, d2					0.3						0.7	
Delay (s)					11.0						7.2	
Level of Service					B						A	
Approach Delay (s)		0.0			11.0			0.0			7.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
45: 11th St & Oak St 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	0	0	613	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	84	0	0	656	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	284	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	284	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	87	100	100			
cM capacity (veh/h)	672	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	84	214	214	214	214
Volume Left	84	0	0	0	0
Volume Right	0	0	0	0	0
cSH	672	1700	1700	1700	1700
Volume to Capacity	0.13	0.13	0.13	0.13	0.13
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
49: 8th St & Oak St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	380	93	177	752	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5902			6052				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5902			6052				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	413	101	192	817	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	50	0	0	94	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	464	0	0	915	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2361			2555				
v/s Ratio Prot					c0.08							
v/s Ratio Perm								0.15				
v/c Ratio					0.20			0.36				
Uniform Delay, d1					8.8			8.8				
Progression Factor					1.00			2.20				
Incremental Delay, d2					0.2			0.3				
Delay (s)					9.0			19.8				
Level of Service					A			B				
Approach Delay (s)		0.0			9.0			19.8			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	16.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	35.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
50: 7th St & Madison St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑									↑↑↑↑	
Volume (vph)	0	1100	305	0	0	0	0	0	0	285	838	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5881									4707	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5881									4707	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1196	332	0	0	0	0	0	0	310	911	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	1500	0	0	0	0	0	0	0	0	1204	0
Confl. Peds. (#/hr)					70						70	
Confl. Bikes (#/hr)					16							
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2614									1883	
v/s Ratio Prot		c0.25										
v/s Ratio Perm											0.26	
v/c Ratio		0.57									0.64	
Uniform Delay, d1		9.3									10.9	
Progression Factor		1.00									2.03	
Incremental Delay, d2		0.9									1.5	
Delay (s)		10.2									23.7	
Level of Service		B									C	
Approach Delay (s)		10.2			0.0			0.0			23.7	
Approach LOS		B			A			A			C	

Intersection Summary				
HCM Average Control Delay	16.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	50.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
51: 7th St & Oak St

5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑						↑↑↑↑				
Volume (vph)	186	1024	0	0	0	0	0	733	238	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.96				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6071						4572				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6071						4572				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	1113	0	0	0	0	0	797	259	0	0	0
RTOR Reduction (vph)	0	46	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	1269	0	0	0	0	0	1041	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2428						1829				
v/s Ratio Prot								c0.23				
v/s Ratio Perm		0.21										
v/c Ratio		0.52						0.57				
Uniform Delay, d1		10.2						10.5				
Progression Factor		1.36						1.00				
Incremental Delay, d2		0.7						1.3				
Delay (s)		14.6						11.8				
Level of Service		B						B				
Approach Delay (s)		14.6			0.0			11.8			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	13.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	45.9%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
52: Lakeshore & 1st Ave #2

5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↑↑↑	↑↑↑	
Volume (vph)	10	10	10	1132	1190	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.94			1.00	1.00	0.79
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1588			3405	3406	1246
Flt Permitted	0.98			0.94	1.00	1.00
Satd. Flow (perm)	1588			3213	3406	1246
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	1230	1293	11
RTOR Reduction (vph)	10	0	0	0	0	2
Lane Group Flow (vph)	12	0	0	1241	1293	9
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	4.5			47.5	47.5	47.5
Effective Green, g (s)	4.5			47.5	47.5	47.5
Actuated g/C Ratio	0.08			0.79	0.79	0.79
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	119			2544	2696	986
v/s Ratio Prot	c0.01				0.38	
v/s Ratio Perm				c0.39		0.01
v/c Ratio	0.10			0.49	0.48	0.01
Uniform Delay, d1	25.9			2.1	2.1	1.3
Progression Factor	1.00			0.20	0.61	0.73
Incremental Delay, d2	0.1			0.0	0.5	0.0
Delay (s)	26.0			0.5	1.8	1.0
Level of Service	C			A	A	A
Approach Delay (s)	26.0			0.5	1.8	
Approach LOS	C			A	A	

Intersection Summary				
HCM Average Control Delay	1.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
53: 12th St #1#2 & Convention Ctr 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2391	10	0	1403	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	1.00			1.00		0.97
Flpb, ped/bikes	1.00			1.00		1.00
Frt	1.00			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4888			4893		1398
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4888			4893		1398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2599	11	0	1525	0	11
RTOR Reduction (vph)	0	0	0	0	0	2
Lane Group Flow (vph)	2610	0	0	1525	0	9
Conf. Peds. (#/hr)		70				70
Conf. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						6
Actuated Green, G (s)	47.7			47.7		4.3
Effective Green, g (s)	47.7			47.7		4.3
Actuated g/C Ratio	0.80			0.80		0.07
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3886			3890		100
v/s Ratio Prot	c0.53			0.31		
v/s Ratio Perm						c0.01
v/c Ratio	0.67			0.39		0.09
Uniform Delay, d1	2.7			1.8		26.0
Progression Factor	0.73			1.00		1.00
Incremental Delay, d2	0.7			0.3		0.1
Delay (s)	2.6			2.1		26.2
Level of Service	A			A		C
Approach Delay (s)	2.6			2.1	26.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1010	810	593	1391	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1098	880	645	1512	0
RTOR Reduction (vph)	0	15	0	0	0	0
Lane Group Flow (vph)	0	1083	880	645	1512	0
Conf. Peds. (#/hr)		70	70			
Conf. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		25.0	25.0	60.0	27.0	
Effective Green, g (s)		25.0	25.0	60.0	27.0	
Actuated g/C Ratio		0.42	0.42	1.00	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1448	1403	3254	2245	
v/s Ratio Prot		c0.31	0.26	0.20	c0.30	
v/s Ratio Perm						
v/c Ratio		0.75	0.63	0.20	0.67	
Uniform Delay, d1		14.8	13.8	0.0	13.0	
Progression Factor		1.00	0.83	1.00	0.85	
Incremental Delay, d2		1.9	0.6	0.1	1.5	
Delay (s)		16.7	12.1	0.1	12.6	
Level of Service		B	B	A	B	
Approach Delay (s)	16.7			7.0	12.6	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	752	0	593	639	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.83		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		3004		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		3004		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	817	0	645	695	0
RTOR Reduction (vph)	0	220	0	0	0	0
Lane Group Flow (vph)	0	598	0	645	695	0
Conf. Peds. (#/hr)		70				
Conf. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		16.1		35.9	35.9	
Effective Green, g (s)		16.1		35.9	35.9	
Actuated g/C Ratio		0.27		0.60	0.60	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		806		2077	1947	
v/s Ratio Prot				0.19	c0.21	
v/s Ratio Perm		c0.20				
v/c Ratio		0.74		0.31	0.36	
Uniform Delay, d1		20.0		5.9	6.2	
Progression Factor		1.00		0.61	0.68	
Incremental Delay, d2		3.2		0.4	0.4	
Delay (s)		23.3		4.0	4.6	
Level of Service		C		A	A	
Approach Delay (s)	23.3			4.0	4.6	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	10	536	521	1445	310	164	180	120	42	545	309
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.97			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.94			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1297	1152	1435	3185	1187	1449	2602			3183	1162
Flt Permitted		0.26	1.00	0.60	1.00	1.00	0.95	0.92			0.89	1.00
Satd. Flow (perm)		347	1152	912	3185	1187	1449	2396			2832	1162
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.95	0.95	0.95	0.78	0.78	0.78
Adj. Flow (vph)	65	11	602	554	1537	330	173	189	126	54	699	396
RTOR Reduction (vph)	0	51	136	0	0	56	0	72	0	0	0	16
Lane Group Flow (vph)	0	139	352	554	1537	274	156	260	0	0	753	380
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		51.5	51.5	51.5	51.5	51.5	9.0	45.5			32.5	32.5
Effective Green, g (s)		51.5	51.5	51.5	51.5	51.5	9.0	45.5			32.5	32.5
Actuated g/C Ratio		0.49	0.49	0.49	0.49	0.49	0.08	0.43			0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		169	560	443	1547	577	123	1046			868	356
v/s Ratio Prot					0.48		c0.11	0.02				
v/s Ratio Perm		0.40	0.31	c0.61		0.23		0.09			0.27	c0.33
v/c Ratio		0.82	0.63	1.25	0.99	0.48	1.27	0.25			0.87	1.07
Uniform Delay, d1		23.3	20.2	27.2	27.1	18.2	48.5	19.3			34.7	36.8
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.81	2.11			1.00	1.00
Incremental Delay, d2		34.6	5.3	130.3	21.4	2.8	162.2	0.5			11.4	66.8
Delay (s)		57.9	25.5	157.6	48.5	21.0	191.5	41.3			46.1	103.5
Level of Service		E	C	F	D	C	F	D			D	F
Approach Delay (s)		34.6			69.7			89.3			65.9	
Approach LOS		C			E			F			E	

Intersection Summary				
HCM Average Control Delay	65.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.19			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	121.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	263	376	327	0	0	0	0	168	370	476	1091	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.98						1.00	1.00	1.00	1.00	
Frt		0.95						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4329						3539	1329	1610	3172	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4329						3539	1329	1610	3172	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.91	0.91	0.91	0.88	0.88	0.88
Adj. Flow (vph)	292	388	337	0	0	0	0	207	407	541	1240	0
RTOR Reduction (vph)	0	84	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	933	0	0	0	0	0	207	407	687	1294	0
Confl. Peds. (#/hr)	70		75						98	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.0						18.0	106.0	45.0	45.0	
Effective Green, g (s)		30.0						18.0	106.0	45.0	45.0	
Actuated g/C Ratio		0.28						0.17	1.00	0.42	0.42	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1225						601	1329	683	1347	
v/s Ratio Prot								0.06		0.30	c0.41	
v/s Ratio Perm		0.22							c0.31			
v/c Ratio		0.76						0.34	0.31	0.71	0.96	
Uniform Delay, d1		34.7						38.8	0.0	25.2	29.6	
Progression Factor		1.00						1.00	1.00	1.06	1.02	
Incremental Delay, d2		4.5						1.6	0.6	2.2	7.8	
Delay (s)		39.2						40.4	0.6	29.0	38.0	
Level of Service		D						D	A	C	D	
Approach Delay (s)		39.2			0.0			14.0			35.6	
Approach LOS		D			A			B			D	

Intersection Summary				
HCM Average Control Delay	32.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	80.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	0	58	326	1029	163	541	231	0	0	256	627
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.88		1.00	1.00	0.96	1.00	1.00			0.87	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.87		1.00	1.00	0.85	1.00	1.00			0.89	
Flt Protected	0.95	0.99		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1173		1770	3539	1332	3433	1863			2581	
Flt Permitted	0.95	0.99		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1173		1770	3539	1332	3433	1863			2581	
Peak-hour factor, PHF	0.86	0.86	0.86	0.96	0.96	0.96	0.78	0.78	0.78	0.94	0.94	0.94
Adj. Flow (vph)	80	0	67	340	1072	170	694	296	0	0	272	667
RTOR Reduction (vph)	0	64	0	0	0	76	0	0	0	0	75	0
Lane Group Flow (vph)	72	11	0	340	1072	94	694	296	0	0	864	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0		30.4	30.4	30.4	19.0	53.1			30.1	
Effective Green, g (s)	5.0	5.0		30.4	30.4	30.4	19.0	53.1			30.1	
Actuated g/C Ratio	0.05	0.05		0.30	0.30	0.30	0.19	0.53			0.30	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	84	59		538	1076	405	652	989			777	
v/s Ratio Prot	c0.04	0.01		0.19	c0.30		c0.20	0.16			c0.33	
v/s Ratio Perm						0.07						
v/c Ratio	0.86	0.19		0.63	1.00	0.23	1.06	0.30			1.50dr	
Uniform Delay, d1	47.1	45.6		30.0	34.7	26.1	40.5	13.1			35.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	64.3	7.1		5.6	26.6	1.3	53.6	0.8			67.6	
Delay (s)	111.4	52.7		35.5	61.3	27.4	94.1	13.9			102.6	
Level of Service	F	D		D	E	C	F	B			F	
Approach Delay (s)		81.5			52.1			70.1			102.6	
Approach LOS		F			D			E			F	

Intersection Summary				
HCM Average Control Delay	71.1	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	92.6%	ICU Level of Service	F	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	277	605	327	0	0	0	0	496	173	530	213	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Util. Factor	1.00	0.91						0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.98						0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00						1.00		1.00	1.00	
Frt	1.00	0.95						0.96		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (prot)	1763	4702						3145		1610	3299	
Flt Permitted	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (perm)	1763	4702						3145		1610	3299	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.85	0.85	0.85	0.87	0.87	0.87
Adj. Flow (vph)	308	672	363	0	0	0	0	584	204	609	245	0
RTOR Reduction (vph)	0	92	0	0	0	0	0	33	0	0	0	0
Lane Group Flow (vph)	308	943	0	0	0	0	0	755	0	304	550	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm									Split		
Protected Phases		4						2		1	1	
Permitted Phases	4											
Actuated Green, G (s)	31.0	31.0						31.0		31.5	31.5	
Effective Green, g (s)	31.0	31.0						31.0		31.5	31.5	
Actuated g/C Ratio	0.29	0.29						0.29		0.30	0.30	
Clearance Time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Grp Cap (vph)	516	1375						920		478	980	
v/s Ratio Prot		c0.20						c0.24		c0.19	0.17	
v/s Ratio Perm	0.17											
v/c Ratio	0.60	0.69						0.82		0.64	0.56	
Uniform Delay, d1	32.1	33.2						34.9		32.3	31.4	
Progression Factor	0.78	0.76						1.00		1.00	1.00	
Incremental Delay, d2	4.0	2.2						8.2		6.3	2.3	
Delay (s)	29.1	27.5						43.1		38.6	33.7	
Level of Service	C	C						D		D	C	
Approach Delay (s)		27.9			0.0			43.1			35.5	
Approach LOS		C			A			D			D	

Intersection Summary				
HCM Average Control Delay	34.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	12.5	
Intersection Capacity Utilization	66.9%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	6	324	383	25	126	839	142	82	74	129	17	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Util. Factor		0.97	0.95		1.00	0.95			0.91	0.91		
Frpb, ped/bikes		1.00	1.00		1.00	0.95			1.00	0.93		
Flpb, ped/bikes		1.00	1.00		0.98	1.00			0.97	1.00		
Frt		1.00	0.99		1.00	0.97			1.00	0.96		
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		
Satd. Flow (prot)		3433	3288		1734	3066			1558	2628		
Flt Permitted		0.57	1.00		0.50	1.00			0.42	0.94		
Satd. Flow (perm)		2065	3288		904	3066			695	2652		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	352	416	27	137	912	154	89	80	140	18	36
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	0	19	0	0
Lane Group Flow (vph)	0	361	438	0	137	1148	0	0	72	183	0	0
Confl. Peds. (#/hr)					70		70	70	70		70	70
Confl. Bikes (#/hr)							16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Perm				Perm			
Protected Phases		5	2			6				4		
Permitted Phases	5				6				4			
Actuated Green, G (s)		7.0	51.0		39.0	39.0			29.0	29.0		
Effective Green, g (s)		7.0	51.0		39.0	39.0			29.0	29.0		
Actuated g/C Ratio		0.08	0.57		0.43	0.43			0.32	0.32		
Clearance Time (s)		5.0	5.0		5.0	5.0			5.0	5.0		
Lane Grp Cap (vph)		161	1863		392	1329			224	855		
v/s Ratio Prot			0.13			c0.37						
v/s Ratio Perm		c0.17			0.15				0.10	0.07		
v/c Ratio		2.24	0.23		0.35	0.86			0.32	0.21		
Uniform Delay, d1		41.5	9.7		17.0	23.1			23.1	22.2		
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2		578.5	0.3		2.4	7.6			3.8	0.6		
Delay (s)		620.0	10.0		19.5	30.7			26.8	22.8		
Level of Service		F	B		B	C			C	C		
Approach Delay (s)			283.9			29.5				23.8		
Approach LOS			F			C				C		

Intersection Summary			
HCM Average Control Delay	101.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	58	21	179	151
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)			5.0	
Lane Util. Factor			0.95	
Frpb, ped/bikes			0.97	
Flpb, ped/bikes			0.97	
Frt			0.94	
Flt Protected			0.99	
Satd. Flow (prot)			3105	
Flt Permitted			0.84	
Satd. Flow (perm)			2619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	23	195	164
RTOR Reduction (vph)	0	0	94	0
Lane Group Flow (vph)	0	0	351	0
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Perm	Perm		
Protected Phases			4	
Permitted Phases	4	4		
Actuated Green, G (s)			29.0	
Effective Green, g (s)			29.0	
Actuated g/C Ratio			0.32	
Clearance Time (s)			5.0	
Lane Grp Cap (vph)			844	
v/s Ratio Prot				
v/s Ratio Perm			c0.13	
v/c Ratio			0.42	
Uniform Delay, d1			23.9	
Progression Factor			1.00	
Incremental Delay, d2			1.5	
Delay (s)			25.4	
Level of Service			C	
Approach Delay (s)			25.4	
Approach LOS			C	

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	10	268	603	605	290	206	389	180	51	563	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			1.00	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)		1621	1445	1735	3539	1291	1610	2943			3515	1296
Flt Permitted		0.47	1.00	0.67	1.00	1.00	0.95	0.93			0.84	1.00
Satd. Flow (perm)		788	1445	1216	3539	1291	1610	2743			2959	1296
Peak-hour factor, PHF	0.91	0.91	0.91	0.89	0.89	0.89	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	95	11	295	678	680	326	222	418	194	55	605	342
RTOR Reduction (vph)	0	12	146	0	0	129	0	51	0	0	0	73
Lane Group Flow (vph)	0	124	119	678	680	197	200	593	0	0	660	269
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		40.5	40.5	40.5	40.5	40.5	9.0	40.5			27.5	27.5
Effective Green, g (s)		40.5	40.5	40.5	40.5	40.5	9.0	40.5			27.5	27.5
Actuated g/C Ratio		0.45	0.45	0.45	0.45	0.45	0.10	0.45			0.31	0.31
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		355	650	547	1593	581	161	1254			904	396
v/s Ratio Prot					0.19		c0.12	0.05				
v/s Ratio Perm		0.16	0.08	c0.56		0.15		0.16			c0.22	0.21
v/c Ratio		0.35	0.18	1.24	0.43	0.34	1.24	0.95dr			0.73	0.68
Uniform Delay, d1		16.2	14.8	24.8	16.8	16.1	40.5	17.2			27.9	27.4
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.05	1.40			1.00	1.00
Incremental Delay, d2		2.7	0.6	122.7	0.8	1.6	146.0	1.1			5.2	9.1
Delay (s)		18.9	15.5	147.5	17.7	17.6	188.5	25.1			33.1	36.5
Level of Service		B	B	F	B	B	F	C			C	D
Approach Delay (s)		16.6			69.9			64.3			34.2	
Approach LOS		B			E			E			C	

Intersection Summary				
HCM Average Control Delay	54.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.06			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	110.9%	ICU Level of Service	H	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	553	339	0	0	0	0	347	1258	625	724	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.97						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	0.99	
Satd. Flow (prot)		4487						3539	1296	1610	3146	
Flt Permitted		0.99						1.00	1.00	0.95	0.99	
Satd. Flow (perm)		4487						3539	1296	1610	3146	
Peak-hour factor, PHF	0.90	0.90	0.90	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	302	614	377	0	0	0	0	365	1324	702	813	0
RTOR Reduction (vph)	0	83	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1210	0	0	0	0	0	365	1324	491	1024	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.0						18.0	90.0	29.0	29.0	
Effective Green, g (s)		30.0						18.0	90.0	29.0	29.0	
Actuated g/C Ratio		0.33						0.20	1.00	0.32	0.32	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1496						708	1296	519	1014	
v/s Ratio Prot								0.10		0.30	0.33	
v/s Ratio Perm		0.27							c1.02			
v/c Ratio		0.81						0.52	1.02	0.95	1.01	
Uniform Delay, d1		27.4						32.1	45.0	29.7	30.5	
Progression Factor		1.00						1.00	1.00	0.85	0.85	
Incremental Delay, d2		4.8						2.7	30.6	16.5	21.5	
Delay (s)		32.2						34.8	75.6	41.7	47.6	
Level of Service		C						C	E	D	D	
Approach Delay (s)		32.2			0.0			66.8			45.7	
Approach LOS		C			A			E			D	

Intersection Summary				
HCM Average Control Delay	49.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0	
Intersection Capacity Utilization	75.8%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	0	173	159	796	270	393	354	0	0	166	278
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.83		1.00	1.00	0.90	1.00	1.00			0.80	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00			0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1102		1770	3539	1245	3433	1863			2401	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1102		1770	3539	1245	3433	1863			2401	
Peak-hour factor, PHF	0.85	0.85	0.85	0.93	0.93	0.93	0.84	0.84	0.84	0.89	0.89	0.89
Adj. Flow (vph)	87	0	204	171	856	290	468	421	0	0	187	312
RTOR Reduction (vph)	0	175	0	0	0	154	0	0	0	0	206	0
Lane Group Flow (vph)	78	38	0	171	856	136	468	421	0	0	293	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	15.0	15.0		35.0	35.0	35.0	17.0	43.5			22.5	
Effective Green, g (s)	15.0	15.0		35.0	35.0	35.0	17.0	43.5			22.5	
Actuated g/C Ratio	0.14	0.14		0.33	0.33	0.33	0.16	0.41			0.21	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Grp Cap (vph)	240	157		590	1180	415	556	772			515	
v/s Ratio Prot	c0.05	0.03		0.10	c0.24		c0.14	c0.23			0.12	
v/s Ratio Perm						0.11						
v/c Ratio	0.33	0.24		0.29	0.73	0.33	0.84	0.55			0.57	
Uniform Delay, d1	40.4	40.0		25.8	30.8	26.2	42.7	23.3			36.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	3.6	3.6		1.2	3.9	2.1	14.3	2.8			4.5	
Delay (s)	44.0	43.6		27.1	34.7	28.3	57.0	26.0			41.4	
Level of Service	D	D		C	C	C	E	C			D	
Approach Delay (s)		43.7			32.3			42.3			41.4	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	37.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	79.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	348	1509	553	0	0	0	0	362	510	479	114	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Util. Factor	1.00	0.91						0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99						0.93		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.96						0.91		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (prot)	1641	4818						2811		1610	3279	
Flt Permitted	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (perm)	1641	4818						2811		1610	3279	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.88	0.88	0.88
Adj. Flow (vph)	370	1605	588	0	0	0	0	381	537	544	130	0
RTOR Reduction (vph)	0	73	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	370	2120	0	0	0	0	0	915	0	272	402	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									Split		
Protected Phases		4						2		1	1	
Permitted Phases	4											
Actuated Green, G (s)	35.0	35.0						28.0		14.5	14.5	
Effective Green, g (s)	35.0	35.0						28.0		14.5	14.5	
Actuated g/C Ratio	0.39	0.39						0.31		0.16	0.16	
Clearance Time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Grp Cap (vph)	638	1874						875		259	528	
v/s Ratio Prot		c0.44						c0.33		c0.17	0.12	
v/s Ratio Perm	0.23											
v/c Ratio	0.58	1.13						1.31dr		1.05	1.00dl	
Uniform Delay, d1	21.7	27.5						31.0		37.8	36.1	
Progression Factor	0.77	0.78						1.00		1.00	1.00	
Incremental Delay, d2	1.2	61.4						42.9		69.7	10.0	
Delay (s)	18.0	82.9						73.9		107.5	46.0	
Level of Service	B	F						E		F	D	
Approach Delay (s)		73.6			0.0			73.9			70.8	
Approach LOS		E			A			E			E	

Intersection Summary				
HCM Average Control Delay	73.2	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.08			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.5	
Intersection Capacity Utilization	95.7%	ICU Level of Service	F	
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	11	567	692	1458	495	178	235	137	112	684	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.97			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1448	1279	1599	3539	1319	1610	2913			3494	1291
Flt Permitted		0.20	1.00	0.59	1.00	1.00	0.95	0.90			0.80	1.00
Satd. Flow (perm)		296	1279	992	3539	1319	1610	2618			2812	1291
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	70	12	616	672	1551	527	187	247	144	122	743	436
RTOR Reduction (vph)	0	48	177	0	0	88	0	60	0	0	0	27
Lane Group Flow (vph)	0	149	346	672	1551	439	166	350	0	0	865	409
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Effective Green, g (s)		48.5	48.5	48.5	48.5	48.5	12.5	48.5			32.0	32.0
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.12	0.46			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		135	585	454	1619	604	190	1233			849	390
v/s Ratio Prot					0.44		c0.10	0.03				
v/s Ratio Perm		0.50	0.27	c0.68		0.33		0.10			0.31	c0.32
v/c Ratio		1.11	0.59	1.48	0.96	0.73	0.88	0.28			1.02	1.05
Uniform Delay, d1		28.8	21.4	28.8	27.8	23.4	46.0	17.9			37.0	37.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.79	1.02			1.00	1.00
Incremental Delay, d2		108.6	4.4	227.7	14.4	7.5	34.5	0.5			35.7	59.3
Delay (s)		137.4	25.7	256.4	42.2	30.9	71.0	18.8			72.7	96.3
Level of Service		F	C	F	D	C	E	B			E	F
Approach Delay (s)		56.3			92.4			34.0			80.6	
Approach LOS		E			F			C			F	

Intersection Summary				
HCM Average Control Delay	78.3	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.25			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	119.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	443	349	0	0	0	0	223	467	524	1225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.97						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4346						3539	1329	1770	3318	
Flt Permitted		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4346						3539	1329	1770	3318	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	457	360	0	0	0	0	242	529	570	1332	0
RTOR Reduction (vph)	0	31	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1215	0	0	0	0	0	242	529	570	1332	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		36.5						29.0	106.0	27.5	60.5	
Effective Green, g (s)		36.5						29.0	106.0	27.5	60.5	
Actuated g/C Ratio		0.34						0.27	1.00	0.26	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1497						968	1329	459	1894	
v/s Ratio Prot								0.07		c0.32		
v/s Ratio Perm		0.28							0.40		c0.40	
v/c Ratio		0.81						0.25	0.40	1.24	0.70	
Uniform Delay, d1		31.6						30.0	0.0	39.2	16.3	
Progression Factor		1.00						1.00	1.00	1.07	0.89	
Incremental Delay, d2		4.9						0.6	0.9	110.6	0.2	
Delay (s)		36.5						30.6	0.9	152.5	14.8	
Level of Service		D						C	A	F	B	
Approach Delay (s)		36.5			0.0			10.2			56.0	
Approach LOS		D			A			B			E	

Intersection Summary				
HCM Average Control Delay	40.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	80.3%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	92	443	1102	165	637	258	0	0	384	704
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00			0.90	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	1.00			0.90	
Flt Protected		0.95			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1681			3489	1338	1770	3539			2705	
Flt Permitted		0.95			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		1681			3489	1338	1770	3539			2705	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	100	461	1148	172	692	280	0	0	409	749
RTOR Reduction (vph)	0	96	0	0	0	64	0	0	0	0	59	0
Lane Group Flow (vph)	97	15	0	0	1609	108	692	280	0	0	1099	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Effective Green, g (s)	3.0	3.0			25.0	25.0	13.0	40.5			23.5	
Actuated g/C Ratio	0.04	0.04			0.31	0.31	0.16	0.51			0.29	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	63	42			1090	418	288	1792			795	
v/s Ratio Prot	c0.06	0.01			c0.46		c0.39	0.08			c0.41	
v/s Ratio Perm						0.08						
v/c Ratio	1.54	0.35			1.48	0.26	2.40	0.16			1.73dr	
Uniform Delay, d1	38.5	37.6			27.5	20.6	33.5	10.6			28.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	307.3	1.8			219.3	1.5	641.6	0.0			179.7	
Delay (s)	345.8	39.4			246.8	22.1	675.3	10.6			208.0	
Level of Service	F	D			F	C	F	B			F	
Approach Delay (s)		182.3			225.1			483.8			208.0	
Approach LOS		F			F			F			F	

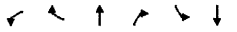
Intersection Summary				
HCM Average Control Delay	279.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.63			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	133.6%	ICU Level of Service	H	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	709	360	0	0	0	0	605	203	739	316	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0						4.0		3.5	4.0	
Lane Util. Factor		0.86						0.95		1.00	0.95	
Frpb, ped/bikes		0.98						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		1.00	1.00	
Frt		0.95						0.96		1.00	1.00	
Flt Protected		0.95						1.00		0.95	1.00	
Satd. Flow (prot)		4461						3150		1770	3539	
Flt Permitted		0.95						1.00		0.12	1.00	
Satd. Flow (perm)		4461						3150		216	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	771	391	0	0	0	0	658	221	803	343	0
RTOR Reduction (vph)	0	83	0	0	0	0	0	23	0	0	0	0
Lane Group Flow (vph)	313	1114	0	0	0	0	0	856	0	803	343	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	31.0	31.0						31.0		66.0	66.0	
Effective Green, g (s)	31.0	31.0						31.0		66.0	66.0	
Actuated g/C Ratio	0.29	0.29						0.29		0.62	0.62	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	443	1305						921		596	2204	
v/s Ratio Prot								0.27		c0.40	0.10	
v/s Ratio Perm	0.21	0.25								c0.44		
v/c Ratio	0.71	0.85						0.93		1.35	0.16	
Uniform Delay, d1	33.4	35.4						36.4		30.1	8.4	
Progression Factor	1.06	1.06						1.00		1.00	1.00	
Incremental Delay, d2	5.0	4.0						16.9		167.2	0.2	
Delay (s)	40.6	41.6						53.3		197.4	8.5	
Level of Service	D	D						D		F	A	
Approach Delay (s)		41.4			0.0			53.3			140.8	
Approach LOS		D			A			D			F	

Intersection Summary				
HCM Average Control Delay	76.6	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.17			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	97.6%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis — Measure DD
9: Boden Way & Lakeshore Av — 5/23/2007

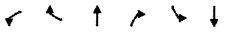


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	54	709	0	10	624
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	15	59	746	0	11	678
Pedestrians	16		1			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	74	746	11	678
Volume Left	15	0	11	0
Volume Right	59	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Measure DD
12: Wesley Ave & Lakeshore Av — 5/23/2007

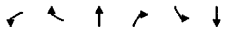


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	21	64	563	14	11	565
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95
Hourly flow rate (vph)	23	69	612	15	12	595
Pedestrians	16		12			1
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.91	0.87			0.87	
vC, conflicting volume	1265	637			643	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1014	503			510	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	88			99	
cM capacity (veh/h)	233	485			901	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	82	627	12	595
Volume Left	23	0	12	0
Volume Right	59	15	0	0
cSH	372	1700	901	1700
Volume to Capacity	0.22	0.37	0.01	0.35
Queue Length 95th (ft)	21	0	1	0
Control Delay (s)	17.4	0.0	9.0	0.0
Lane LOS	C		A	
Approach Delay (s)	17.4	0.0	0.2	
Approach LOS	C			

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Measure DD
16: E 16th St & 1st Ave #2 — 5/23/2007



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	16	432	5	0	2049
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	470	5	0	2227
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.65	0.99			0.99	
vC, conflicting volume	1656	378			545	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841	339			509	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	186	574			976	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	313	162	1114	1114
Volume Left	0	0	0	0	0
Volume Right	20	0	5	0	0
cSH	574	1700	1700	1700	1700
Volume to Capacity	0.03	0.18	0.10	0.66	0.66
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Measure DD
20: Foothill Blvd #2 & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	41	596	15	21	33	0	0	21	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	45	648	16	23	36	0	0	23	24
Pedestrians		25						26			3	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	667			26			499	782	26	766	774	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	667			26			499	782	26	766	774	360
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			94	88	100	100	93	96
cM capacity (veh/h)	916			1552			368	307	1021	255	311	635

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	368	340	59	47
Volume Left	45	0	23	0
Volume Right	0	16	0	24
cSH	1552	1700	334	421
Volume to Capacity	0.03	0.20	0.18	0.11
Queue Length 95th (ft)	2	0	16	9
Control Delay (s)	1.1	0.0	18.0	14.6
Lane LOS	A		C	B
Approach Delay (s)	0.6		18.0	14.6
Approach LOS			C	B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Measure DD
10: Cleveland St & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	709	0	0	633
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.95	0.95	0.92	0.92
Adj. Flow (vph)	0	0	746	0	0	688
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	746	0	0	688
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1375
v/s Ratio Prot			c0.46			0.42
v/s Ratio Perm						
v/c Ratio			0.54			0.50
Uniform Delay, d1			2.7			2.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.2			0.1
Delay (s)			2.9			2.6
Level of Service			A			A
Approach Delay (s)	0.0		2.9			2.6
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.8	HCM Level of Service		A
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)		18.8
Intersection Capacity Utilization	40.6%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
11: Brooklyn Av & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓		↑↑		↰	↑
Volume (vph)	85	120	563	11	98	555
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.90		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.92		1.00		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1324		1620		1770	1863
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1324		1620		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	130	612	12	107	603
RTOR Reduction (vph)	91	0	1	0	0	0
Lane Group Flow (vph)	131	0	623	0	107	603
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	6.9		23.1		4.2	31.3
Effective Green, g (s)	6.9		23.1		4.2	31.3
Actuated g/C Ratio	0.16		0.52		0.10	0.71
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	207		847		168	1319
v/s Ratio Prot	c0.10		c0.38		c0.06	0.32
v/s Ratio Perm						
v/c Ratio	0.63		0.74		0.64	0.46
Uniform Delay, d1	17.5		8.2		19.3	2.8
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	4.6		2.9		5.7	0.1
Delay (s)	22.0		11.1		25.0	2.9
Level of Service	C		B		C	A
Approach Delay (s)	22.0		11.1			6.2
Approach LOS	C		B			A

Intersection Summary				
HCM Average Control Delay	10.4	HCM Level of Service		B
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	44.2	Sum of lost time (s)		10.0
Intersection Capacity Utilization	60.8%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
13: Hanover Ave & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↓		↑↑		↰	↑
Volume (vph)	60	130	504	35	58	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.95		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.91		0.99		1.00	1.00
Flt Protected	0.98		1.00		0.95	1.00
Satd. Flow (prot)	1384		1609		1770	1630
Flt Permitted	0.98		1.00		0.95	1.00
Satd. Flow (perm)	1384		1609		1770	1630
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	65	141	548	38	60	604
RTOR Reduction (vph)	94	0	4	0	0	0
Lane Group Flow (vph)	112	0	582	0	60	604
Confl. Peds. (#/hr)	70	31		17	17	
Confl. Bikes (#/hr)		7		15		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		24.0		5.0	33.0
Effective Green, g (s)	20.0		24.0		5.0	33.0
Actuated g/C Ratio	0.33		0.40		0.08	0.55
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	461		644		148	897
v/s Ratio Prot	c0.08		c0.36		0.03	c0.37
v/s Ratio Perm						
v/c Ratio	0.24		0.90		0.41	0.67
Uniform Delay, d1	14.5		16.9		26.1	9.6
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.2		18.4		8.1	4.0
Delay (s)	15.8		35.3		34.1	13.7
Level of Service	B		D		C	B
Approach Delay (s)	15.8		35.3			15.5
Approach LOS	B		D			B

Intersection Summary				
HCM Average Control Delay	23.5	HCM Level of Service		C
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)		10.0
Intersection Capacity Utilization	59.6%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
14: E. 18th St & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↑		↑↑		↰	↑↑
Volume (vph)	1040	178	338	310	29	696
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.97		0.96		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.98		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3276		2951		1770	3362
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3276		2951		1770	3362
Peak-hour factor, PHF	0.93	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1118	191	367	337	32	757
RTOR Reduction (vph)	16	0	147	0	0	0
Lane Group Flow (vph)	1293	0	557	0	32	757
Confl. Peds. (#/hr)	70	78		36	36	
Confl. Bikes (#/hr)		4		36		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			0
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	46.6		40.8		3.6	47.4
Effective Green, g (s)	46.6		40.8		3.6	47.4
Actuated g/C Ratio	0.47		0.41		0.04	0.47
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	1527		1204		64	1594
v/s Ratio Prot	c0.39		0.19		0.02	
v/s Ratio Perm						c0.23
v/c Ratio	0.85		0.46		0.50	0.47
Uniform Delay, d1	23.6		21.6		47.3	17.9
Progression Factor	1.00		0.80		1.00	1.00
Incremental Delay, d2	4.4		1.2		2.2	1.0
Delay (s)	27.9		18.4		49.5	18.9
Level of Service	C		B		D	B
Approach Delay (s)	27.9		18.4			20.1
Approach LOS	C		B			C

Intersection Summary				
HCM Average Control Delay	23.3	HCM Level of Service		C
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		6.0
Intersection Capacity Utilization	66.8%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
15: Foothill Blvd #2 & Lakeshore Av #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	353	261	497	0	0	1716
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.94		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.94		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3056		3406			3406
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3056		3406			3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	384	284	540	0	0	1865
RTOR Reduction (vph)	144	0	0	0	0	0
Lane Group Flow (vph)	524	0	540	0	0	1865
Confl. Peds. (#/hr)		43				
Confl. Bikes (#/hr)		3				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	20.7		72.8			72.8
Effective Green, g (s)	20.7		72.8			72.8
Actuated g/C Ratio	0.21		0.73			0.73
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	633		2480			2480
v/s Ratio Prot	c0.17		0.16			c0.55
v/s Ratio Perm						
v/c Ratio	0.83		0.22			0.75
Uniform Delay, d1	38.0		4.4			8.2
Progression Factor	1.00		1.14			1.22
Incremental Delay, d2	8.4		0.2			1.6
Delay (s)	46.3		5.2			11.6
Level of Service	D		A			B
Approach Delay (s)	46.3		5.2			11.6
Approach LOS	D		A			B

Intersection Summary				
HCM Average Control Delay	18.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	73.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
17: E 15th St & 1st Ave #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	437	137	234	1812
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.98			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3253			3401
Flt Permitted			1.00			0.76
Satd. Flow (perm)			3253			2594
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	475	149	254	1970
RTOR Reduction (vph)	0	0	12	0	0	0
Lane Group Flow (vph)	0	0	612	0	0	2224
Confl. Peds. (#/hr)				17		
Confl. Bikes (#/hr)				4		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type				pm+pt		
Protected Phases			2	14	6	
Permitted Phases				6		
Actuated Green, G (s)			86.4			92.0
Effective Green, g (s)			86.4			92.0
Actuated g/C Ratio			0.86			0.92
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2811			2432
v/s Ratio Prot			0.19			c0.05
v/s Ratio Perm						c0.79
v/c Ratio			0.22			0.91
Uniform Delay, d1			1.1			2.0
Progression Factor			1.88			4.36
Incremental Delay, d2			0.2			4.0
Delay (s)			2.3			12.8
Level of Service			A			B
Approach Delay (s)	0.0		2.3			12.8
Approach LOS	A		A			B

Intersection Summary				
HCM Average Control Delay	10.5	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
18: International Blvd & 1st Ave #1#2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	660	59	475	102	10	1802
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.99		1.00	0.96		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3314		3406	2614		3405
Flt Permitted	0.96		1.00	1.00		0.95
Satd. Flow (perm)	3314		3406	2614		3242
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	717	64	516	111	11	1959
RTOR Reduction (vph)	7	0	0	37	0	0
Lane Group Flow (vph)	774	0	516	74	0	1970
Confl. Peds. (#/hr)	70	57		7		
Confl. Bikes (#/hr)		1		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	25.7		66.3	66.3		66.3
Effective Green, g (s)	25.7		66.3	66.3		66.3
Actuated g/C Ratio	0.25		0.66	0.66		0.66
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	852		2258	1733		2149
v/s Ratio Prot	c0.23		0.15			
v/s Ratio Perm				0.03		c0.61
v/c Ratio	0.91		0.23	0.04		0.92
Uniform Delay, d1	36.0		6.7	5.8		14.5
Progression Factor	1.00		0.33	0.00		0.87
Incremental Delay, d2	13.1		0.2	0.0		3.7
Delay (s)	49.1		2.4	0.1		16.4
Level of Service	D		A	A		B
Approach Delay (s)	49.1		2.0			16.4
Approach LOS	D		A			B

Intersection Summary				
HCM Average Control Delay	21.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	84.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

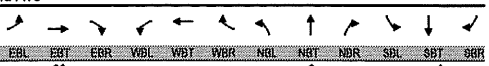
HCM Signalized Intersection Capacity Analysis — Measure DD
19: Driveway & 1st Ave #1#2 — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	1138	0	33	0	544	375	10	2447	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.93		1.00	0.99			0.94		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		0.97	1.00	
Frt		0.96		1.00	0.99			0.94		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1630		3221	1387			5373		1718	4890	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1630		3221	1387			5373		1718	4890	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	1237	0	36	0	591	408	11	2660	5
RTOR Reduction (vph)	0	1	0	0	4	0	0	105	0	0	0	0
Lane Group Flow (vph)	0	65	0	854	415	0	0	893	0	11	2665	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split						Prot		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		7.6		25.0	25.0			50.6		0.8	55.4	
Effective Green, g (s)		7.6		25.0	25.0			50.6		0.8	55.4	
Actuated g/C Ratio		0.08		0.25	0.25			0.51		0.01	0.55	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		124		805	347			2719		14	2709	
v/s Ratio Prot		c0.04		0.27	c0.30			0.17		0.01	c0.54	
v/s Ratio Perm												
v/c Ratio		0.52		1.06	1.20			0.33		0.79	0.98	
Uniform Delay, d1		44.5		37.5	37.5			14.6		49.5	21.9	
Progression Factor		1.00		1.00	1.00			0.14		1.09	0.84	
Incremental Delay, d2		1.8		49.1	113.2			0.3		68.0	7.9	
Delay (s)		46.3		86.6	150.7			2.3		121.9	26.2	
Level of Service		D		F	F			A		F	C	
Approach Delay (s)		46.3			107.7			2.3			26.6	
Approach LOS		D			F			A			C	

Intersection Summary				
HCM Average Control Delay	42.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.00			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	82.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Measure DD
21: E 15th St #1 & 2nd Ave — 5/23/2007

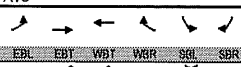


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑						↑	↱		↑	
Volume (veh/h)	20	280	92	0	0	0	0	31	25	15	56	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	304	100	0	0	0	0	34	27	16	63	0
Pedestrians					30			27			17	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	17			431			456	442	259	287	492	17
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	17			302			328	313	121	150	365	17
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	94	97	98	88	100
cM capacity (veh/h)	1576			1169			488	544	845	669	508	1043

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	174	252	61	79
Volume Left	22	0	0	16
Volume Right	0	100	27	0
cSH	1576	1700	647	534
Volume to Capacity	0.01	0.15	0.09	0.15
Queue Length 95th (ft)	1	0	8	13
Control Delay (s)	1.0	0.0	11.1	12.9
Lane LOS	A		B	B
Approach Delay (s)	0.4		11.1	12.9
Approach LOS			B	B

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
24: E. 10th St & 2nd Ave — 5/23/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↱	
Volume (veh/h)	18	137	566	7	9	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	149	604	8	10	38
Pedestrians		70	70		70	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	682				936	748
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	682				936	748
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				96	90
cM capacity (veh/h)	858				255	366

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	168	612	48
Volume Left	20	0	10
Volume Right	0	8	38
cSH	858	1700	336
Volume to Capacity	0.02	0.36	0.14
Queue Length 95th (ft)	2	0	12
Control Delay (s)	1.3	0.0	17.5
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	17.5
Approach LOS			C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

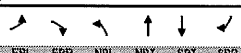
HCM Unsignalized Intersection Capacity Analysis — Measure DD
37: 17th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↰			↑↑		
Volume (veh/h)	128	0	0	1182	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	0	0	1285	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1087	659	
pX, platoon unblocked	0.96					
vC, conflicting volume	712	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	614	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	100	100			
cM capacity (veh/h)	406	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	70	70	642	642
Volume Left	70	70	0	0
Volume Right	0	0	0	0
cSH	406	406	1700	1700
Volume to Capacity	0.17	0.17	0.38	0.38
Queue Length 95th (ft)	15	15	0	0
Control Delay (s)	15.7	15.7	0.0	0.0
Lane LOS	C	C		
Approach Delay (s)	15.7		0.0	
Approach LOS	C			

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	75.5%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
45: 11th St & Oak St — 5/23/2007



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰			↑↑↑		
Volume (veh/h)	28	0	0	924	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	0	1004	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	321	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	637	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	30	251	251	251	251
Volume Left	30	0	0	0	0
Volume Right	0	0	0	0	0
cSH	637	1700	1700	1700	1700
Volume to Capacity	0.05	0.15	0.15	0.15	0.15
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.9	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	23.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Measure DD
22: International Blvd & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	11	14	31	11	662	24	21	42	11	20	66	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.95			1.00			0.99			0.95	
Flpb, ped/bikes		1.00			1.00			0.99			0.99	
Frt		0.92			0.99			0.98			0.92	
Flt Protected		0.99			1.00			0.99			1.00	
Satd. Flow (prot)		2827			3220			1534			1400	
Flt Permitted		0.87			0.95			0.92			0.98	
Satd. Flow (perm)		2485			3067			1424			1378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	15	34	12	611	26	23	46	12	22	72	150
RTOR Reduction (vph)	0	24	0	0	8	0	0	5	0	0	49	0
Lane Group Flow (vph)	0	37	0	0	641	0	0	76	0	0	195	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1		2				2	
Permitted Phases	1			1				2		2		
Actuated Green, G (s)		19.5			19.5			39.5			39.5	
Effective Green, g (s)		19.5			19.5			39.5			39.5	
Actuated g/C Ratio		0.30			0.30			0.61			0.61	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		746			920			865			837	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.21			0.05			c0.14	
v/c Ratio		0.05			0.70			0.09			0.23	
Uniform Delay, d1		16.2			20.1			5.3			5.8	
Progression Factor		1.00			0.38			1.00			1.00	
Incremental Delay, d2		0.0			1.2			0.2			0.7	
Delay (s)		16.2			8.9			5.5			6.5	
Level of Service		B			A			A			A	
Approach Delay (s)		16.2			8.9			5.5			6.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
23: E. 12TH & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	55	265	55	33	1116	19	33	44	12	46	47	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		0.96			1.00			0.98			1.00	0.86
Flpb, ped/bikes		1.00			1.00			0.96			0.95	1.00
Frt		0.98			1.00			0.98			1.00	0.86
Flt Protected		0.99			1.00			0.98			0.98	1.00
Satd. Flow (prot)		3104			3499			1483			1725	1363
Flt Permitted		0.70			0.93			0.87			0.81	1.00
Satd. Flow (perm)		2197			3269			1307			1436	1363
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	288	60	36	1213	21	36	48	13	52	51	24
RTOR Reduction (vph)	0	16	0	0	1	0	0	6	0	0	0	18
Lane Group Flow (vph)	0	392	0	0	1269	0	0	91	0	0	103	6
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5			5			5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		57.5			57.5			23.0			23.0	23.0
Effective Green, g (s)		57.5			57.5			23.0			23.0	23.0
Actuated g/C Ratio		0.64			0.64			0.26			0.26	0.26
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1404			2089			334			367	348
v/s Ratio Prot												
v/s Ratio Perm		0.18			c0.39			0.07			c0.07	0.00
v/c Ratio		0.28			0.61			0.27			0.28	0.02
Uniform Delay, d1		7.1			9.6			26.8			26.9	25.1
Progression Factor		1.00			1.00			1.03			1.00	1.00
Incremental Delay, d2		0.5			1.3			2.0			1.9	0.1
Delay (s)		7.6			10.9			29.6			28.8	25.1
Level of Service		A			B			C			C	C
Approach Delay (s)		7.6			10.9			29.6			28.1	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
25: Foothill Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Volume (vph)	0	0	0	195	669	58	44	213	0	0	224	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			0.99	
Flpb, ped/bikes					0.98			0.99			1.00	
Frt					0.99			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3213			1647			1652	
Flt Permitted					0.99			0.92			1.00	
Satd. Flow (perm)					3213			1529			1652	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	212	727	63	48	232	0	0	243	16
RTOR Reduction (vph)	0	0	0	0	8	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	994	0	0	280	0	0	255	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1		2				2	
Permitted Phases				1				2				
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1335			741			801	
v/s Ratio Prot											0.15	
v/s Ratio Perm					0.31			c0.18				
v/c Ratio					0.74			0.38			0.32	
Uniform Delay, d1					16.1			10.6			10.2	
Progression Factor					1.00			1.28			1.00	
Incremental Delay, d2					3.8			1.2			1.0	
Delay (s)					19.9			14.7			11.3	
Level of Service					B			B			B	
Approach Delay (s)		0.0			19.9			14.7			11.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
26: International Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	10	247	23	59	876	32	56	215	77	41	348	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.97			0.99	
Flt Protected		1.00			1.00			0.99			1.00	
Satd. Flow (prot)		3284			3313			1564			1630	
Flt Permitted		0.92			0.91			0.88			0.94	
Satd. Flow (perm)		3032			3038			1407			1536	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	268	25	64	952	35	63	234	84	45	378	48
RTOR Reduction (vph)	0	10	0	0	4	0	0	16	0	0	6	0
Lane Group Flow (vph)	0	294	0	0	1047	0	0	365	0	0	465	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1376			1379			606			662	
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.34			0.26			c0.30	
v/c Ratio		0.21			0.76			0.60			0.70	
Uniform Delay, d1		10.7			14.8			14.2			15.1	
Progression Factor		1.01			1.00			1.03			0.66	
Incremental Delay, d2		0.4			4.0			0.4			5.4	
Delay (s)		11.2			18.8			15.0			15.4	
Level of Service		B			B			B			B	
Approach Delay (s)		11.2			18.8			15.0			15.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
27: E 12th Street & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	285	99	72	1105	67	128	308	53	48	350	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			0.99			1.00	
Frt		0.98			0.99			0.99			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3162			3304			1609			1619	
Flt Permitted		0.82			0.90			0.68			0.92	
Satd. Flow (perm)		2616			2972			1114			1489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	310	108	78	1201	73	139	335	58	52	380	66
RTOR Reduction (vph)	0	47	0	0	6	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	401	0	0	1346	0	0	525	0	0	489	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1328			1509			428			573	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.45			c0.47			0.33	
v/c Ratio		0.30			0.89			1.23			0.85	
Uniform Delay, d1		9.3			14.4			20.0			18.3	
Progression Factor		1.00			1.00			1.00			0.68	
Incremental Delay, d2		0.6			8.4			115.3			11.8	
Delay (s)		9.9			22.8			135.2			24.3	
Level of Service		A			C			F			C	
Approach Delay (s)		9.9			22.8			135.2			24.3	
Approach LOS		A			C			F			C	

Intersection Summary				
HCM Average Control Delay	42.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	125.2%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
28: E. 8th St & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	258	43	227	1110	27	98	508	88	16	313	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.99	1.00		0.97	1.00		0.97	1.00	1.00	0.98	1.00	1.00
Frt	1.00	0.98		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1746	4761		1711	4885		1718	1676	1471	1737	1676	1471
Flt Permitted	0.16	1.00		0.55	1.00		0.45	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	289	4761		984	4885		814	1676	1471	439	1676	1471
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	280	47	247	1207	29	107	552	96	17	340	75
RTOR Reduction (vph)	0	25	0	0	4	0	0	0	55	0	0	13
Lane Group Flow (vph)	80	302	0	247	1232	0	107	552	41	17	340	62
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2		2	2		2
Actuated Green, G (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Effective Green, g (s)	30.5	30.5		30.5	30.5		27.5	27.5	27.5	27.5	27.5	27.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	136	2234		462	2292		344	709	622	186	709	622
v/s Ratio Prot		0.06			0.25			c0.33			0.20	
v/s Ratio Perm	c0.28			0.25			0.13		0.03	0.04		0.04
v/c Ratio	0.59	0.14		0.53	0.54		0.31	0.78	0.07	0.09	0.48	0.10
Uniform Delay, d1	12.6	9.8		12.2	12.2		12.5	16.1	11.1	11.3	13.6	11.3
Progression Factor	1.00	1.00		1.00	1.00		1.50	1.51	2.66	0.55	0.63	0.44
Incremental Delay, d2	17.3	0.1		4.4	0.9		2.1	7.4	0.2	0.6	1.5	0.2
Delay (s)	29.9	9.9		16.6	13.2		20.8	31.7	29.9	6.8	10.0	5.2
Level of Service	C	A		B	B		C	C	C	A	A	A
Approach Delay (s)		13.8			13.7			29.9			9.0	
Approach LOS		B			B			C			A	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	77.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
29: Embarcadero & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	91	196	342	119	36	347	429	10	119	118	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.91	0.91	1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	1.00	0.91	1.00	1.00		1.00	0.95	
Flpb, ped/bikes	0.94	1.00		0.93	1.00	1.00	0.97	1.00		0.96	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1669	2720		1639	3198	1316	1717	1668		3269	1426	
Flt Permitted	0.66	1.00		0.56	1.00	1.00	0.43	1.00		0.36	1.00	
Satd. Flow (perm)	1167	2720		970	3198	1316	774	1668		1246	1426	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	99	213	372	129	39	377	466	11	129	128	273
RTOR Reduction (vph)	0	128	0	0	2	21	0	1	0	0	118	0
Lane Group Flow (vph)	189	184	0	372	131	14	377	476	0	129	283	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.0	26.0		26.0	26.0	26.0	31.0	31.0		31.0	31.0	
Effective Green, g (s)	26.0	26.0		26.0	26.0	26.0	31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.48	0.48		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	467	1088		388	1279	526	369	796		594	680	
v/s Ratio Prot		0.07			0.04			0.29			0.20	
v/s Ratio Perm	0.16			c0.38		0.01	c0.49			0.10		
v/c Ratio	0.40	0.17		0.96	0.10	0.03	1.02	0.60		0.22	0.42	
Uniform Delay, d1	14.0	12.5		19.0	12.2	11.8	17.0	12.4		9.9	11.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.30	1.91	
Incremental Delay, d2	2.6	0.3		36.4	0.2	0.1	52.5	3.3		0.7	1.7	
Delay (s)	16.6	12.9		55.4	12.4	11.9	69.5	15.7		13.7	22.8	
Level of Service	B	B		E	B	B	E	B		B	C	
Approach Delay (s)		14.3			42.0			39.5			20.6	
Approach LOS		B			D			D			C	

Intersection Summary				
HCM Average Control Delay	30.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.99			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations												
Volume (vph)	12	397	550	47	163	1145	155	90	81	141	32	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	1.00		1.00	0.96			1.00	0.97		0.91
Flpb, ped/bikes		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.97			1.00	0.97		0.86
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3433	3279		1770	3112			3433	1449		1364
Flt Permitted		0.57	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		2065	3279		1770	3112			3433	1449		1364
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	421	598	51	177	1245	168	98	88	153	35	39
RTOR Reduction (vph)	0	0	5	0	0	4	0	0	0	1	0	29
Lane Group Flow (vph)	0	434	644	0	177	1507	0	0	88	191	0	6
Confl. Peds. (#/hr)					70		70	70			70	70
Confl. Bikes (#/hr)									16	16		16
Parking (#/hr)			5			5					5	
Turn Type	custom	Prot			Prot				Prot			Perm
Protected Phases		5	2		1	6			7	4		
Permitted Phases	5											4
Actuated Green, G (s)		7.0	54.3		5.0	51.3			4.0	18.3		18.3
Effective Green, g (s)		7.0	54.3		5.0	51.3			4.0	18.3		18.3
Actuated g/C Ratio		0.07	0.55		0.05	0.52			0.04	0.18		0.18
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		145	1788		89	1603			138	266		251
v/s Ratio Prot			c0.20		0.10	c0.48			0.03	c0.13		
v/s Ratio Perm		c0.21										0.00
v/c Ratio		2.99	0.36		1.99	0.94			0.64	0.72		0.03
Uniform Delay, d1		46.3	12.8		47.3	22.7			47.1	38.2		33.3
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		915.2	0.6		482.5	12.2			6.9	7.5		0.0
Delay (s)		961.5	13.4		529.8	34.9			54.0	45.7		33.4
Level of Service		F	B		F	C			D	D		C
Approach Delay (s)			393.3			86.8				46.7		
Approach LOS			F			F				D		

Intersection Summary				
HCM Average Control Delay	181.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	24.0	
Intersection Capacity Utilization	99.1%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	64	31	200	177
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1436
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	34	217	192
RTOR Reduction (vph)	0	0	0	157
Lane Group Flow (vph)	0	125	217	35
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases		3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	18.3	18.3
Effective Green, g (s)		4.0	18.3	18.3
Actuated g/C Ratio		0.04	0.18	0.18
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		71	342	264
v/s Ratio Prot		c0.07	0.12	
v/s Ratio Perm				0.02
v/c Ratio		1.76	0.63	0.13
Uniform Delay, d1		47.8	37.6	34.0
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		393.3	2.8	0.1
Delay (s)		441.1	40.4	34.1
Level of Service		F	D	C
Approach Delay (s)			131.9	
Approach LOS			F	

Intersection Summary

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HCM Signalized Intersection Capacity Analysis — Measure DD
31: Grand Av & Harrison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	257	100	618	834	116	265	1023	347	48	1183	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.97		1.00	0.98			1.00	0.93		0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	0.98			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)	3433	3246		3400	3384			4989	1456		4594	
Flt Permitted	0.95	1.00		0.95	1.00			0.67	1.00		0.77	
Satd. Flow (perm)	3433	3246		3400	3384			3387	1456		3533	
Peak-hour factor, PHF	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	262	102	672	907	126	288	1112	377	52	1286	320
RTOR Reduction (vph)	0	5	0	0	12	0	0	0	222	0	42	0
Lane Group Flow (vph)	118	359	0	672	1021	0	0	1400	155	0	1616	0
Confl. Peds. (#/hr)	124		81	81		124	84		53	53		84
Confl. Bikes (#/hr)			7			12			5			4
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Effective Green, g (s)	5.0	16.5		24.5	37.0			39.0	39.0		39.0	
Actuated g/C Ratio	0.05	0.17		0.26	0.39			0.41	0.41		0.41	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	181	564		877	1318			1390	598		1450	
v/s Ratio Prot	0.03	c0.11		0.20	c0.30							
v/s Ratio Perm								0.41	0.11		c0.46	
v/c Ratio	0.65	0.64		0.77	0.77			3.65d	0.26		1.11	
Uniform Delay, d1	44.1	36.5		32.6	25.4			28.0	18.5		28.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	6.3	1.7		3.6	4.5			25.9	0.1		61.5	
Delay (s)	50.4	38.2		36.2	29.9			53.9	18.6		89.5	
Level of Service	D	D		D	C			D	B		F	
Approach Delay (s)		41.2			32.4			45.4			89.5	
Approach LOS		D			C			D			F	

Intersection Summary

HCM Average Control Delay	54.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	112.7%	ICU Level of Service	H
Analysis Period (min)	15		

d Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

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HCM Signalized Intersection Capacity Analysis — Measure DD
32: 20th St #3 & Lakeside Dr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	570	56	532	995	192	1129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.99		1.00	1.00	0.91	0.88
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.89	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4785		3367	4893	2863	1265
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4785		3367	4893	2863	1265
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.94	0.92
Adj. Flow (vph)	620	58	578	1082	204	1227
RTOR Reduction (vph)	13	0	0	0	347	347
Lane Group Flow (vph)	665	0	578	1082	471	266
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	17.0		19.0	40.0	32.0	32.0
Effective Green, g (s)	17.0		19.0	40.0	32.0	32.0
Actuated g/C Ratio	0.21		0.24	0.50	0.40	0.40
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1017		800	2447	1145	506
v/s Ratio Prot	c0.14		c0.17	0.22	0.16	
v/s Ratio Perm						c0.21
v/c Ratio	0.65		0.72	0.44	0.41	0.52
Uniform Delay, d1	28.8		28.1	12.8	17.2	18.2
Progression Factor	1.29		1.08	0.94	1.00	1.00
Incremental Delay, d2	2.9		2.3	0.2	1.1	3.9
Delay (s)	40.2		32.5	12.3	18.3	22.1
Level of Service	D		C	B	B	C
Approach Delay (s)	40.2			19.3	19.9	
Approach LOS	D			B	B	

Intersection Summary

HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumu(2025)+No El Embarc- AM Peak — Synchro 7 - Report Page 23

HCM Signalized Intersection Capacity Analysis — Measure DD
33: 20th St #3 & Driveway — 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SER2
Lane Configurations											
Volume (vph)	175	124	516	555	116	102	62	0	451	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.95		1.00	1.00	0.83			0.96	0.91	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.94		1.00	1.00	0.85			0.93	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4424		1770	3406	1317			1529	1407	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4424		1770	3406	1317			1529	1407	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	135	561	603	126	111	67	0	490	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	42	226	0	0
Lane Group Flow (vph)	325	0	561	603	126	0	0	303	97	33	11
Confl. Peds. (#/hr)			70	70		70	70		70		
Confl. Bikes (#/hr)			16		16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	6			8		Free
Actuated Green, G (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Effective Green, g (s)	17.0		27.0	38.0	38.0			24.0	24.0	6.0	80.0
Actuated g/C Ratio	0.21		0.34	0.48	0.48			0.30	0.30	0.08	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	940		597	1618	626			459	422	121	1611
v/s Ratio Prot	c0.07		c0.32	0.18				c0.20		0.02	
v/s Ratio Perm					0.10				0.07		0.01
v/c Ratio	0.35		0.94	0.37	0.20			0.66	0.23	0.27	0.01
Uniform Delay, d1	26.8		25.7	13.4	12.2			24.4	21.1	34.9	0.0
Progression Factor	1.00		0.63	0.78	0.85			1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0		23.0	0.6	0.7			7.3	1.3	5.5	0.0
Delay (s)	27.8		39.2	11.1	11.0			31.7	22.3	40.4	0.0
Level of Service	C		D	B	B			C	C	D	A
Approach Delay (s)	27.8			23.3				27.2			
Approach LOS	C			C				C			

Intersection Summary

HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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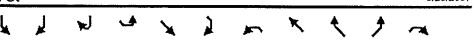
HCM Signalized Intersection Capacity Analysis — Measure DD
34: Jackson St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	19	1	1040	362	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1507			1630	1559	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1507			1630	1559	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92
Adj. Flow (vph)	201	21	1	1072	393	113
RTOR Reduction (vph)	5	0	0	0	14	0
Lane Group Flow (vph)	217	0	0	1073	492	0
Confl. Peds. (#/hr)	13	5	6			6
Confl. Bikes (#/hr)		1				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4			6		
Permitted Phases			2	2		
Actuated Green, G (s)	13.0			55.0	55.0	
Effective Green, g (s)	13.0			55.0	55.0	
Actuated g/C Ratio	0.17			0.73	0.73	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	261			1195	1143	
v/s Ratio Prot	c0.14				0.32	
v/s Ratio Perm				c0.66		
v/c Ratio	0.83			0.90	0.43	
Uniform Delay, d1	29.9			7.8	3.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	25.5			10.7	1.2	
Delay (s)	55.4			18.5	5.1	
Level of Service	E			B	A	
Approach Delay (s)	55.4			18.5	5.1	
Approach LOS	E			B	A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
35: Lakeside Dr & 19th St — 5/23/2007

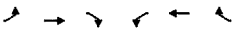


Movement	SBL	SBR	SBR2	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	406	8	0	0	0	0	221	1039	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3318	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	441	9	0	0	0	0	240	1129	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	450	0	0	0	0	0	240	1129	0	0
Confl. Peds. (#/hr)			70								
Confl. Bikes (#/hr)			1								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.5						21.0	45.0		
Effective Green, g (s)		17.5						21.0	41.5		
Actuated g/C Ratio		0.39						0.47	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		602						1548	1428		
v/s Ratio Prot		0.29						0.07			
v/s Ratio Perm									c0.73		
v/c Ratio		0.75						0.16	0.79		
Uniform Delay, d1		11.8						6.9	0.5		
Progression Factor		1.00						1.00	1.00		
Incremental Delay, d2		8.3						0.2	4.5		
Delay (s)		20.1						7.1	5.0		
Level of Service		C						A	A		
Approach Delay (s)	20.1				0.0			5.4		0.0	
Approach LOS	C				A			A		A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	3.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
36: 17th St & Madison St — 5/23/2007

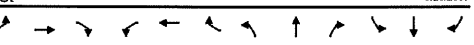


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	66	167	0	0	0	0	0	0	80	375	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.96									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.89									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		2812									4779	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		2812									4779	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	182	0	0	0	0	0	0	87	408	0
RTOR Reduction (vph)	0	119	0	0	0	0	0	0	0	0	43	0
Lane Group Flow (vph)	0	135	0	0	0	0	0	0	0	0	452	0
Confl. Peds. (#/hr)			39							20		
Confl. Bikes (#/hr)			1									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		2									1	
Permitted Phases										1		
Actuated Green, G (s)		15.5									23.0	
Effective Green, g (s)		15.5									23.0	
Actuated g/C Ratio		0.34									0.51	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		969									2443	
v/s Ratio Prot		c0.05										
v/s Ratio Perm											0.09	
v/c Ratio		0.14									0.19	
Uniform Delay, d1		10.2									5.9	
Progression Factor		1.00									2.59	
Incremental Delay, d2		0.3									0.1	
Delay (s)		10.5									15.5	
Level of Service		B									B	
Approach Delay (s)		10.5			0.0			0.0			15.5	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
38: 14th St & Madison St — 5/23/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	187	135	156	930	0	0	0	0	212	359	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.98			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.90	0.99	
Frt		0.94			1.00					1.00	1.00	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		2983			3231					1265	3143	
Flt Permitted		1.00			0.84					0.95	1.00	
Satd. Flow (perm)		2983			2733					1265	3143	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93
Adj. Flow (vph)	0	195	141	170	1011	0	0	0	0	228	386	0
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	261	0	0	1181	0	0	0	0	198	416	0
Confl. Peds. (#/hr)			48	48						129		
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			0		5	5	
Turn Type			Perm							Perm		
Protected Phases		2			2						1	
Permitted Phases			2							1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1392			1275					478	1187	
v/s Ratio Prot		0.09										
v/s Ratio Perm					c0.43					c0.16	0.13	
v/c Ratio		0.19			0.93					0.41	0.35	
Uniform Delay, d1		7.0			11.3					10.3	10.0	
Progression Factor		1.00			1.00					1.69	1.68	
Incremental Delay, d2		0.3			12.8					2.6	0.8	
Delay (s)		7.3			24.1					20.1	17.7	
Level of Service		A			C					C	B	
Approach Delay (s)		7.3			24.1			0.0			18.4	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
39: 14th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	379	0	0	1103	868	139	476	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.83		0.99				
Flpb, ped/bikes		1.00			1.00	1.00		0.96				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		0.99			1.00	1.00		0.99				
Satd. Flow (prot)		3178			3471	1309		4538				
Flt Permitted		0.71			1.00	1.00		0.99				
Satd. Flow (perm)		2285			3471	1309		4538				
Peak-hour factor, PHF	0.93	0.93	0.93	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	408	0	0	1161	914	151	517	43	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	7	0	7	0	0	0	0
Lane Group Flow (vph)	0	469	0	0	1161	907	0	704	0	0	0	0
Confl. Peds. (#/hr)	98					98	132		61			
Confl. Bikes (#/hr)						43			4			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		72.0			72.0	72.0		19.5				
Effective Green, g (s)		72.0			72.0	72.0		19.5				
Actuated g/C Ratio		0.72			0.72	0.72		0.20				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1645			2499	942		885				
v/s Ratio Prot					0.33							
v/s Ratio Perm		0.21				c0.69		0.16				
v/c Ratio		0.29			0.46	0.96		0.80				
Uniform Delay, d1		4.9			5.9	12.8		38.3				
Progression Factor		1.00			0.29	0.38		1.00				
Incremental Delay, d2		0.4			0.4	16.7		4.7				
Delay (s)		5.4			2.1	21.5		43.0				
Level of Service		A			A	C		D				
Approach Delay (s)		5.4			10.7			43.0			0.0	
Approach LOS		A			B			D			A	

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
40: 13th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	447	90	0	0	0	0	0	0	85	497	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5938									4752	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5938									4752	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	486	98	0	0	0	0	0	0	92	540	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	0	52	0
Lane Group Flow (vph)	0	532	0	0	0	0	0	0	0	0	580	0
Confl. Peds. (#/hr)					70					70		
Confl. Bikes (#/hr)					16							
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2771									1795	
v/s Ratio Prot		c0.09										
v/s Ratio Perm											0.12	
v/c Ratio		0.19									0.32	
Uniform Delay, d1		7.0									9.9	
Progression Factor		1.00									1.32	
Incremental Delay, d2		0.2									0.4	
Delay (s)		7.2									13.5	
Level of Service		A									B	
Approach Delay (s)		7.2			0.0			0.0			13.5	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
41: 13th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	344	0	0	0	0	0	647	175	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.92			
Flpb, ped/bikes	0.98	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1512	4873						4831	1450			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1512	4873						4831	1450			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	374	0	0	0	0	0	703	190	0	0	0
RTOR Reduction (vph)	28	0	0	0	0	0	0	0	110	0	0	0
Lane Group Flow (vph)	21	374	0	0	0	0	0	703	80	0	0	0
Confl. Peds. (#/hr)	33								91			
Confl. Bikes (#/hr)									3			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	655	2112						2040	612			
v/s Ratio Prot		c0.08						c0.15				
v/s Ratio Perm	0.01								0.06			
v/c Ratio	0.03	0.18						0.34	0.13			
Uniform Delay, d1	7.3	7.8						8.8	8.0			
Progression Factor	0.91	0.86						2.06	5.28			
Incremental Delay, d2	0.1	0.2						0.4	0.4			
Delay (s)	6.8	6.9						18.5	42.4			
Level of Service	A	A						B	D			
Approach Delay (s)		6.9			0.0			23.6			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
42: 12th St #2 & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	444	1650	0	0	0	0	0	591	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5921						4669	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5921						4669	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	483	1685	0	0	0	0	0	642	113
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	2107	0	0	0	0	0	751	0
Confl. Peds. (#/hr)				40								67
Confl. Bikes (#/hr)												10
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2763						1764	
v/s Ratio Prot											c0.16	
v/s Ratio Perm					0.36							
v/c Ratio					0.76						0.43	
Uniform Delay, d1					9.9						10.4	
Progression Factor					0.26						1.63	
Incremental Delay, d2					0.5						0.7	
Delay (s)					3.1						17.7	
Level of Service					A						B	
Approach Delay (s)		0.0			3.1			0.0			17.7	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
43: 12th St #2 & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1660	88	203	712	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					4653			5927				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					4653			5927				
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2000	95	218	766	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2083	0	0	983	0	0	0	0
Confl. Peds. (#/hr)						74	161					
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1965			2305				
v/s Ratio Prot					c0.45							
v/s Ratio Perm								c0.17				
v/c Ratio					1.06			0.43				
Uniform Delay, d1					13.0			10.1				
Progression Factor					1.00			1.70				
Incremental Delay, d2					38.5			0.5				
Delay (s)					51.5			17.6				
Level of Service					D			B				
Approach Delay (s)		0.0			51.5			17.6			0.0	
Approach LOS		A			D			B			A	

Intersection Summary				
HCM Average Control Delay	40.7	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	59.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
44: 11th St & Madison St — 5/23/2007

Movement	SBL	SBT	SBR									
Lane Configurations												
Volume (vph)	64	949	28	350	174							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900							
Total Lost time (s)		5.0	5.0	5.0								
Lane Util. Factor		0.91	1.00	0.91								
Frpb, ped/bikes		1.00	1.00	0.97								
Flpb, ped/bikes		1.00	1.00	1.00								
Frt		1.00	1.00	0.95								
Flt Protected		1.00	0.95	1.00								
Satd. Flow (prot)		4796	1548	4396								
Flt Permitted		1.00	0.95	1.00								
Satd. Flow (perm)		4796	1548	4396								
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92							
Adj. Flow (vph)	70	1032	30	380	189							
RTOR Reduction (vph)	0	0	0	16	0							
Lane Group Flow (vph)	0	1102	30	553	0							
Confl. Peds. (#/hr)	70				70							
Confl. Bikes (#/hr)					16							
Heavy Vehicles (%)	2%	2%	2%	6%	2%							
Parking (#/hr)		10	5	5								
Turn Type	Perm		custom									
Protected Phases		2	1	1								
Permitted Phases	2		1									
Actuated Green, G (s)		17.0	18.0	18.0								
Effective Green, g (s)		17.0	18.0	18.0								
Actuated g/C Ratio		0.38	0.40	0.40								
Clearance Time (s)		5.0	5.0	5.0								
Lane Grp Cap (vph)		1812	619	1758								
v/s Ratio Prot			0.02	c0.13								
v/s Ratio Perm		0.23										
v/c Ratio		0.61	0.05	0.31								
Uniform Delay, d1		11.3	8.3	9.3								
Progression Factor		1.17	1.00	1.00								
Incremental Delay, d2		1.3	0.1	0.5								
Delay (s)		14.5	8.4	9.7								
Level of Service		B	A	A								
Approach Delay (s)		14.5		9.7								
Approach LOS		B		A								

Intersection Summary				
HCM Average Control Delay	12.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	41.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
46: E. 10th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	303	475	0	0	0	0	107	1082	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0							
Lane Util. Factor					0.95							
Frpb, ped/bikes					1.00							
Flpb, ped/bikes					0.98							
Frt					1.00							
Flt Protected					0.98							
Satd. Flow (prot)					3132							
Flt Permitted					0.98							
Satd. Flow (perm)					3132							
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	329	516	0	0	0	0	116	1176	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	18	0
Lane Group Flow (vph)	0	0	0	0	845	0	0	0	0	0	1365	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1114						2416	
v/s Ratio Prot												
v/s Ratio Perm					0.27						0.29	
v/c Ratio					0.76						0.57	
Uniform Delay, d1					12.8						7.6	
Progression Factor					1.16						0.38	
Incremental Delay, d2					0.5						0.8	
Delay (s)					15.3						3.7	
Level of Service					B						A	
Approach Delay (s)		0.0			15.3			0.0			3.7	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	8.1	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	53.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
47: E. 10th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	61	0	0	654	150	114	773	103	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3292			1564			5969				
Flt Permitted		0.73			1.00			0.99				
Satd. Flow (perm)		2425			1564			5969				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	66	0	0	711	163	124	840	112	0	0	0
RTOR Reduction (vph)	0	0	0	0	19	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	76	0	0	855	0	0	1032	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		808			521			2918				
v/s Ratio Prot					c0.55							
v/s Ratio Perm		0.03						0.17				
v/c Ratio		0.09			1.64			0.35				
Uniform Delay, d1		10.3			15.0			7.1				
Progression Factor		1.78			1.00			0.73				
Incremental Delay, d2		0.2			297.4			0.3				
Delay (s)		18.6			312.4			5.5				
Level of Service		B			F			A				
Approach Delay (s)		18.6			312.4			5.5			0.0	
Approach LOS		B			F			A			A	

Intersection Summary				
HCM Average Control Delay	138.4	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
48: 8th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	413	780	0	0	0	0	0	1423	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					5946						4769	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					5946						4769	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	449	848	0	0	0	0	0	1547	100
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	16	0
Lane Group Flow (vph)	0	0	0	0	1290	0	0	0	0	0	1631	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2246						2226	
v/s Ratio Prot											c0.34	
v/s Ratio Perm					0.22							
v/c Ratio					0.57						0.73	
Uniform Delay, d1					11.1						9.7	
Progression Factor					1.29						1.05	
Incremental Delay, d2					0.9						1.8	
Delay (s)					15.3						12.0	
Level of Service					B						B	
Approach Delay (s)		0.0			15.3			0.0			12.0	
Approach LOS		A			B			A			B	

Intersection Summary				
HCM Average Control Delay	13.5	HCM Level of Service		B
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	59.4%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
49: 8th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑			↰↑↑↑				
Volume (vph)	0	0	0	0	1016	100	203	1084	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6045			6071				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6045			6071				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1104	109	221	1178	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1198	0	0	1384	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2418			2563				
v/s Ratio Prot					c0.20							
v/s Ratio Perm								0.23				
v/c Ratio					0.50			0.54				
Uniform Delay, d1					10.1			9.7				
Progression Factor					1.00			2.04				
Incremental Delay, d2					0.7			0.4				
Delay (s)					10.8			20.3				
Level of Service					B			C				
Approach Delay (s)		0.0			10.8			20.3			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM Average Control Delay	15.9	HCM Level of Service		B
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	42.3%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
50: 7th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑↑	
Volume (vph)	0	647	564	0	0	0	0	0	0	270	1578	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.97									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.93									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5561									4759	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5561									4759	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	703	613	0	0	0	0	0	0	293	1715	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	1314	0	0	0	0	0	0	0	0	1955	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2472									1904	
v/s Ratio Prot		c0.24										
v/s Ratio Perm											0.41	
v/c Ratio		1.04dr									1.03	
Uniform Delay, d1		9.1									13.5	
Progression Factor		1.00									1.72	
Incremental Delay, d2		0.8									24.6	
Delay (s)		9.9									47.9	
Level of Service		A									D	
Approach Delay (s)		9.9			0.0			0.0			47.9	
Approach LOS		A			A			A			D	

Intersection Summary				
HCM Average Control Delay	32.8	HCM Level of Service		C
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	63.8%	ICU Level of Service		B
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
51: 7th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑						↑↑↑↱				
Volume (vph)	150	739	0	0	0	0	0	1211	310	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.87				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6062						4615				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6062						4615				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	803	0	0	0	0	0	1316	337	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	959	0	0	0	0	0	1608	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2425						1846				
v/s Ratio Prot								c0.35				
v/s Ratio Perm		0.16										
v/c Ratio		0.40						0.87				
Uniform Delay, d1		9.6						12.4				
Progression Factor		1.19						1.00				
Incremental Delay, d2		0.4						6.0				
Delay (s)		11.8						18.4				
Level of Service		B						B				
Approach Delay (s)		11.8			0.0			18.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary				
HCM Average Control Delay	16.0	HCM Level of Service		B
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		9.0
Intersection Capacity Utilization	51.8%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
52: Lakeshore & 1st Ave #2 — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	10	427	2039	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.91			1.00	1.00	0.66
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1539			3405	3406	1051
Flt Permitted	0.98			0.88	1.00	1.00
Satd. Flow (perm)	1539			3007	3406	1051
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	464	2216	11
RTOR Reduction (vph)	10	0	0	0	0	1
Lane Group Flow (vph)	12	0	0	475	2216	10
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	5.6			86.4	86.4	86.4
Effective Green, g (s)	5.6			86.4	86.4	86.4
Actuated g/C Ratio	0.06			0.86	0.86	0.86
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	86			2598	2943	908
v/s Ratio Prot	c0.01				c0.65	
v/s Ratio Perm				0.16		0.01
v/c Ratio	0.14			0.18	0.75	0.01
Uniform Delay, d1	44.9			1.1	2.6	0.9
Progression Factor	1.00			0.27	0.41	0.32
Incremental Delay, d2	0.3			0.0	1.2	0.0
Delay (s)	45.2			0.3	2.3	0.3
Level of Service	D			A	A	A
Approach Delay (s)	45.2			0.3	2.3	
Approach LOS	D			A	A	

Intersection Summary				
HCM Average Control Delay	2.3	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	76.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
53: 12th St #1#2 & Convention Ctr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	909	333	0	3585	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	0.94			1.00		0.79
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.96			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4440			4893		1276
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4440			4893		1276
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	988	362	0	3897	0	11
RTOR Reduction (vph)	33	0	0	0	0	11
Lane Group Flow (vph)	1317	0	0	3897	0	0
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	87.9			87.9		4.1
Effective Green, g (s)	87.9			87.9		4.1
Actuated g/C Ratio	0.88			0.88		0.04
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3903			4301		52
v/s Ratio Prot	0.30			c0.80		
v/s Ratio Perm						c0.00
v/c Ratio	0.34			0.91		0.01
Uniform Delay, d1	1.0			3.6		46.0
Progression Factor	0.79			0.90		1.00
Incremental Delay, d2	0.2			0.4		0.0
Delay (s)	1.0			3.6		46.0
Level of Service	A			A		D
Approach Delay (s)	1.0			3.6	46.0	
Approach LOS	A			A	D	

Intersection Summary				
HCM Average Control Delay	3.0	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	88.3%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
54: 11th-12th St #1#2 & 14th St — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	414	1805	1780	828	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	450	1962	1935	900	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	0	445	1962	1935	900	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		67.6	67.6	100.0	24.4	
Effective Green, g (s)		67.6	67.6	100.0	24.4	
Actuated g/C Ratio		0.68	0.68	1.00	0.24	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		2348	2276	3254	1217	
v/s Ratio Prot		0.13	c0.58	0.59	c0.18	
v/s Ratio Perm						
v/c Ratio		0.19	0.86	0.59	0.74	
Uniform Delay, d1		6.0	12.6	0.0	34.9	
Progression Factor		1.00	0.64	1.00	0.93	
Incremental Delay, d2		0.0	1.7	0.4	4.0	
Delay (s)		6.0	9.8	0.4	36.4	
Level of Service		A	A	A	D	
Approach Delay (s)	6.0			5.1	36.4	
Approach LOS	A			A	D	

Intersection Summary				
HCM Average Control Delay	10.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.83			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	89.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
55: 13th St & 14th St — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	409	0	1971	419	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.70		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		2518		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		2518		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	445	0	2142	455	0
RTOR Reduction (vph)	0	415	0	0	0	0
Lane Group Flow (vph)	0	30	0	2142	455	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		6.8		85.2	85.2	
Effective Green, g (s)		6.8		85.2	85.2	
Actuated g/C Ratio		0.07		0.85	0.85	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		171		2957	2772	
v/s Ratio Prot				c0.62	0.14	
v/s Ratio Perm		c0.01				
v/c Ratio		0.18		0.72	0.16	
Uniform Delay, d1		44.0		2.9	1.3	
Progression Factor		1.00		0.62	0.88	
Incremental Delay, d2		0.2		1.4	0.1	
Delay (s)		44.1		3.1	1.2	
Level of Service		D		A	A	
Approach Delay (s)	44.1			3.1	1.2	
Approach LOS	D			A	A	

Intersection Summary				
HCM Average Control Delay	8.8	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	73.5%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	11	293	728	605	604	221	393	197	154	680	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1621	1441	1736	3539	1286	1610	2932			3487	1297
Flt Permitted		0.32	1.00	0.63	1.00	1.00	0.95	0.92			0.69	1.00
Satd. Flow (perm)		534	1441	1143	3539	1286	1610	2708			2445	1297
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	12	318	791	658	657	238	423	212	166	731	344
RTOR Reduction (vph)	0	11	200	0	0	238	0	56	0	0	0	45
Lane Group Flow (vph)	0	135	86	791	658	419	214	603	0	0	897	299
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Effective Green, g (s)		27.0	27.0	27.0	27.0	27.0	13.5	54.0			36.5	36.5
Actuated g/C Ratio		0.30	0.30	0.30	0.30	0.30	0.15	0.60			0.41	0.41
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		160	432	343	1062	386	242	1658			992	526
v/s Ratio Prot					0.19		c0.13	0.05				
v/s Ratio Perm		0.25	0.06	c0.69		0.33		0.16			c0.37	0.23
v/c Ratio		0.84	0.20	2.31	0.62	1.09	0.88	0.36			0.90	0.57
Uniform Delay, d1		29.5	23.4	31.5	27.1	31.5	37.5	9.2			25.1	20.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.87	2.57			1.00	1.00
Incremental Delay, d2		38.9	1.0	596.9	2.7	70.7	29.4	0.5			13.1	4.4
Delay (s)		68.4	24.5	628.4	29.8	102.2	62.0	24.2			38.2	25.1
Level of Service		E	C	F	C	F	E	C			D	C
Approach Delay (s)		39.3			277.2			33.5			34.6	
Approach LOS		D			F			C			C	

Intersection Summary				
HCM Average Control Delay	144.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.39			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	120.3%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	1108	346	0	0	0	0	389	1347	922	784	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.5	
Lane Util. Factor		0.91						0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.98						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.97						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4606						3539	1296	1770	3318	
Flt Permitted		0.99						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4606						3539	1296	1770	3318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	296	1204	376	0	0	0	0	409	1418	1002	852	0
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1827	0	0	0	0	0	409	1418	1002	852	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Prot		
Protected Phases		4						2		1		
Permitted Phases	4								Free		6	
Actuated Green, G (s)		30.0						25.5	90.0	21.5	51.0	
Effective Green, g (s)		30.0						25.5	90.0	21.5	51.0	
Actuated g/C Ratio		0.33						0.28	1.00	0.24	0.57	
Clearance Time (s)		4.5						4.5		4.0	4.5	
Lane Grp Cap (vph)		1535						1003	1296	423	1880	
v/s Ratio Prot								0.12		c0.57		
v/s Ratio Perm		0.40							c1.09		0.26	
v/c Ratio		1.19						0.41	1.09	2.37	0.45	
Uniform Delay, d1		30.0						26.1	45.0	34.2	11.4	
Progression Factor		1.00						1.00	1.00	1.20	1.21	
Incremental Delay, d2		92.5						1.2	54.8	616.6	0.1	
Delay (s)		122.5						27.4	99.8	657.8	13.9	
Level of Service		F						C	F	F	B	
Approach Delay (s)		122.5			0.0			83.6			361.9	
Approach LOS		F			A			F			F	

Intersection Summary				
HCM Average Control Delay	189.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.41			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0	
Intersection Capacity Utilization	111.8%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	0	368	243	1230	270	405	441	0	0	180	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		1.00			1.00	0.90	1.00	1.00			0.80	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		1.00			1.00	0.85	1.00	1.00			0.91	
Flt Protected		0.95			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		1681			3510	1249	1770	3539			2412	
Flt Permitted		0.95			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		1681			3510	1249	1770	3539			2412	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	0	400	261	1323	290	440	479	0	0	196	317
RTOR Reduction (vph)	0	373	0	0	0	82	0	0	0	0	102	0
Lane Group Flow (vph)	35	31	0	0	1584	208	440	479	0	0	411	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	7.0	7.0			43.0	43.0	17.0	41.1			20.1	
Effective Green, g (s)	7.0	7.0			43.0	43.0	17.0	41.1			20.1	
Actuated g/C Ratio	0.07	0.07			0.42	0.42	0.17	0.40			0.20	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	115	60			1471	523	293	1418			473	
v/s Ratio Prot	0.02	c0.04			c0.45		c0.25	0.14			c0.17	
v/s Ratio Perm						0.17						
v/c Ratio	0.30	0.52			1.08	0.40	1.50	0.34			0.98dr	
Uniform Delay, d1	45.5	46.2			29.8	20.8	42.8	21.3			40.0	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.5	3.7			47.1	2.3	242.9	0.1			15.0	
Delay (s)	46.0	49.9			76.9	23.0	285.7	21.4			55.0	
Level of Service	D	D			E	C	F	C			D	
Approach Delay (s)		49.6			68.6			147.9			55.0	
Approach LOS		D			E			F			D	

Intersection Summary				
HCM Average Control Delay	84.0	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.07			
Actuated Cycle Length (s)	102.6	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	113.5%	ICU Level of Service	H	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	448	2294	588	0	0	0	0	393	530	575	157	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0						4.0			3.5	4.0
Lane Util. Factor		0.86						0.95			1.00	0.95
Frpb, ped/bikes		1.00						0.93			1.00	1.00
Flpb, ped/bikes		0.93						1.00			1.00	1.00
Frt		1.00						0.91			1.00	1.00
Flt Protected		0.95						1.00			0.95	1.00
Satd. Flow (prot)		4607						2823			1770	3539
Flt Permitted		0.95						1.00			0.15	1.00
Satd. Flow (perm)		4607						2823			282	3539
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	477	2440	626	0	0	0	0	414	558	625	171	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	429	3071	0	0	0	0	0	969	0	625	171	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	28.0	28.0						38.0		53.0	53.0	
Effective Green, g (s)	28.0	28.0						38.0		53.0	53.0	
Actuated g/C Ratio	0.31	0.31						0.42		0.59	0.59	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	439	1433						1192		356	2084	
v/s Ratio Prot								0.34		c0.22	0.05	
v/s Ratio Perm	0.30	0.67								c0.81		
v/c Ratio	0.98	2.14						1.00dr		1.76	0.08	
Uniform Delay, d1	30.7	31.0						22.9		19.7	8.0	
Progression Factor	1.10	1.10						1.00		1.00	1.00	
Incremental Delay, d2	8.6	514.5						6.1		351.4	0.1	
Delay (s)	42.3	548.5						29.0		371.1	8.1	
Level of Service	D	F						C		F	A	
Approach Delay (s)		487.2			0.0			29.0			293.1	
Approach LOS		F			A			C			F	

Intersection Summary				
HCM Average Control Delay	374.2	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.86			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	123.9%	ICU Level of Service	H	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis — Measure DD
9: Boden Way & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	26	695	0	13	699
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.94	0.94
Hourly flow rate (vph)	1	28	712	0	14	744
Pedestrians	29		70			4
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	2		6			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			459			
pX, platoon unblocked	0.00	0.00	0.00	0.00	0.00	0.00
vC, conflicting volume	0	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	0			0	
cM capacity (veh/h)	0	0			0	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	29	712	14	744
Volume Left	1	0	14	0
Volume Right	28	0	0	0
cSH	0	0	0	0
Volume to Capacity	0.00	0.00	0.00	0.00
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A		A	
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
12: Wesley Ave & Lakeshore Av — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	5	608	12	27	660
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	5	661	13	29	717
Pedestrians	11		6			2
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	1		1			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1161			348
pX, platoon unblocked	0.78	0.72			0.72	
vC, conflicting volume	1460	680			685	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1117	361			367	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			97	
cM capacity (veh/h)	170	487			849	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	12	674	29	717
Volume Left	7	0	29	0
Volume Right	5	13	0	0
cSH	241	1700	849	1700
Volume to Capacity	0.05	0.40	0.03	0.42
Queue Length 95th (ft)	4	0	3	0
Control Delay (s)	20.7	0.0	9.4	0.0
Lane LOS	C		A	
Approach Delay (s)	20.7	0.0	0.4	
Approach LOS	C			

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	45.4%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
16: E 16th St & 1st Ave #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	24	1309	35	0	1219
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	26	1423	38	0	1325
Pedestrians	70					70
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	4.0					4.0
Percent Blockage	6					6
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			103			149
pX, platoon unblocked	0.88	0.80			0.80	
vC, conflicting volume	2174	870			1531	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1242	346			1169	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	139	462			448	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	949	512	662	662
Volume Left	0	0	0	0	0
Volume Right	26	0	38	0	0
cSH	462	1700	1700	1700	1700
Volume to Capacity	0.06	0.56	0.30	0.39	0.39
Queue Length 95th (ft)	4	0	0	0	0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.2	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	56.8%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
20: Foothill Blvd #2 & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	27	249	13	56	143	0	0	18	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	29	271	14	63	155	0	0	20	34
Pedestrians		35						15			1	
Lane Width (ft)		0.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		326			1068							
pX, platoon unblocked												
vC, conflicting volume	286			15			288	359	15	415	352	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			15			288	359	15	415	352	178
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			89	72	100	100	96	96
cM capacity (veh/h)	1272			1581			578	548	1047	398	553	833

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	165	149	218	53
Volume Left	29	0	63	0
Volume Right	0	14	0	34
cSH	1581	1700	556	702
Volume to Capacity	0.02	0.09	0.39	0.08
Queue Length 95th (ft)	1	0	46	6
Control Delay (s)	1.4	0.0	15.6	10.5
Lane LOS	A		C	B
Approach Delay (s)	0.7		15.6	10.5
Approach LOS			C	B

Intersection Summary				
Average Delay	7.2			
Intersection Capacity Utilization	32.3%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
10: Cleveland St & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	0	0	655	0	0	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			1.00			1.00
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			1630			1630
Flt Permitted			1.00			1.00
Satd. Flow (perm)			1630			1630
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	0	0	712	0	0	736
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	712	0	0	736
Parking (#/hr)			5			5
Turn Type						
Protected Phases			2			6
Permitted Phases						
Actuated Green, G (s)			101.6			101.6
Effective Green, g (s)			101.6			101.6
Actuated g/C Ratio			0.84			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			1375			1376
v/s Ratio Prot			0.44			c0.45
v/s Ratio Perm						
v/c Ratio			0.52			0.54
Uniform Delay, d1			2.6			2.7
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			0.2
Delay (s)			2.7			2.9
Level of Service			A			A
Approach Delay (s)	0.0		2.7			2.9
Approach LOS	A		A			A

Intersection Summary				
HCM Average Control Delay	2.8	HCM Level of Service		A
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	120.4	Sum of lost time (s)		18.8
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Brooklyn Av & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	32	113	584	80	73	566
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		4.0		3.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.86		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1245		1572		1770	1863
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1245		1572		1770	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	123	635	87	79	615
RTOR Reduction (vph)	108	0	7	0	0	0
Lane Group Flow (vph)	50	0	715	0	79	615
Confl. Peds. (#/hr)	70	70		70	70	
Confl. Bikes (#/hr)		16		16		
Parking (#/hr)	5		5			
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	5.4		25.6		2.3	31.9
Effective Green, g (s)	5.4		25.6		2.3	31.9
Actuated g/C Ratio	0.12		0.59		0.05	0.74
Clearance Time (s)	3.0		4.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	155		929		94	1373
v/s Ratio Prot	c0.04		c0.45		c0.04	0.33
v/s Ratio Perm						
v/c Ratio	0.32		0.77		0.84	0.45
Uniform Delay, d1	17.3		6.6		20.3	2.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		3.5		44.4	0.1
Delay (s)	17.7		10.1		64.7	2.3
Level of Service	B		B		E	A
Approach Delay (s)	17.7		10.1			9.4
Approach LOS	B		B			A

Intersection Summary				
HCM Average Control Delay	10.6	HCM Level of Service		B
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	43.3	Sum of lost time (s)		10.0
Intersection Capacity Utilization	62.8%	ICU Level of Service		B
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Hanover Ave & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑			↑
Volume (vph)	13	67	609	88	141	577
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		3.0		4.0	3.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.92		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.89		0.98		1.00	1.00
Flt Protected	0.99		1.00		0.95	1.00
Satd. Flow (prot)	1321		1586		1770	1630
Flt Permitted	0.99		1.00		0.95	1.00
Satd. Flow (perm)	1321		1586		1770	1630
Peak-hour factor, PHF	0.92	0.92	0.93	0.93	0.92	0.92
Adj. Flow (vph)	14	73	655	95	153	627
RTOR Reduction (vph)	55	0	6	0	0	0
Lane Group Flow (vph)	32	0	744	0	153	627
Confl. Peds. (#/hr)	70	36		20	20	
Confl. Bikes (#/hr)		2		10		
Parking (#/hr)	5		5			5
Turn Type					Prot	
Protected Phases	8		2		1	6
Permitted Phases						
Actuated Green, G (s)	20.0		41.0		8.0	53.0
Effective Green, g (s)	20.0		41.0		8.0	53.0
Actuated g/C Ratio	0.25		0.51		0.10	0.66
Clearance Time (s)	4.0		3.0		4.0	3.0
Lane Grp Cap (vph)	330		813		177	1080
v/s Ratio Prot	c0.02		c0.47		c0.09	0.38
v/s Ratio Perm						
v/c Ratio	0.10		0.91		0.86	0.58
Uniform Delay, d1	23.1		17.9		35.5	7.4
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.6		16.6		39.4	2.3
Delay (s)	23.7		34.5		74.9	9.7
Level of Service	C		C		E	A
Approach Delay (s)	23.7		34.5			22.5
Approach LOS	C		C			C

Intersection Summary				
HCM Average Control Delay	28.1	HCM Level of Service		C
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)		11.0
Intersection Capacity Utilization	72.1%	ICU Level of Service		C
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: E. 18th St & Lakeshore Av

Measure DD
5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑			↑↑
Volume (vph)	469	51	546	672	135	611
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0		3.0	3.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frpb, ped/bikes	0.99		0.98		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.99		0.92		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3355		2953		1770	3539
Flt Permitted	0.96		1.00		0.95	1.00
Satd. Flow (perm)	3355		2953		1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	532	55	593	730	147	664
RTOR Reduction (vph)	15	0	300	0	0	0
Lane Group Flow (vph)	572	0	1023	0	147	664
Confl. Peds. (#/hr)	1	44		24	24	
Confl. Bikes (#/hr)		6		31		
Heavy Vehicles (%)	3%	2%	2%	3%	2%	2%
Parking (#/hr)			5			
Turn Type					Prot	
Protected Phases	8		2		1	
Permitted Phases						6
Actuated Green, G (s)	14.4		25.2		6.1	34.3
Effective Green, g (s)	14.4		25.2		6.1	34.3
Actuated g/C Ratio	0.26		0.46		0.11	0.63
Clearance Time (s)	3.0		3.0		3.0	3.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	883		1360		197	2219
v/s Ratio Prot	c0.17		c0.35		c0.08	
v/s Ratio Perm						0.19
v/c Ratio	0.65		0.75		0.75	0.30
Uniform Delay, d1	17.9		12.2		23.5	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	1.2		3.9		12.6	0.3
Delay (s)	19.1		16.0		36.1	5.0
Level of Service	B		B		D	A
Approach Delay (s)	19.1		16.0			10.7
Approach LOS	B		B			B

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service		B
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	54.7	Sum of lost time (s)		9.0
Intersection Capacity Utilization	75.1%	ICU Level of Service		D
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
15: Foothill Blvd #2 & Lakeshore Av #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	216	113	1333	0	0	1001
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5		3.0			3.0
Lane Util. Factor	0.97		0.95			0.95
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.95		1.00			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3188		3406			3406
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3188		3406			3406
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.92	0.92
Adj. Flow (vph)	234	122	1433	0	0	1088
RTOR Reduction (vph)	19	0	0	0	0	0
Lane Group Flow (vph)	337	0	1433	0	0	1088
Confl. Peds. (#/hr)		42				
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	4%	2%	6%	2%	2%	6%
Turn Type						
Protected Phases	8		2			6
Permitted Phases						
Actuated Green, G (s)	10.6		32.9			32.9
Effective Green, g (s)	10.6		32.9			32.9
Actuated g/C Ratio	0.21		0.66			0.66
Clearance Time (s)	3.5		3.0			3.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	676		2241			2241
v/s Ratio Prot	c0.11		c0.42			0.32
v/s Ratio Perm						
v/c Ratio	0.50		0.64			0.49
Uniform Delay, d1	17.4		5.0			4.3
Progression Factor	1.00		0.41			1.00
Incremental Delay, d2	0.2		1.2			0.8
Delay (s)	17.6		3.3			5.1
Level of Service	B		A			A
Approach Delay (s)	17.6		3.3			5.1
Approach LOS	B		A			A

Intersection Summary				
HCM Average Control Delay	5.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	57.5%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
17: E 15th St & 1st Ave #2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	0	1344	310	254	1026
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0
Lane Util. Factor			0.95			0.95
Frpb, ped/bikes			0.99			1.00
Flpb, ped/bikes			1.00			1.00
Frt			0.97			1.00
Flt Protected			1.00			0.99
Satd. Flow (prot)			3291			3396
Flt Permitted			1.00			0.51
Satd. Flow (perm)			3291			1760
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1461	337	276	1115
RTOR Reduction (vph)	0	0	15	0	0	0
Lane Group Flow (vph)	0	0	1783	0	0	1391
Confl. Peds. (#/hr)				26	70	
Confl. Bikes (#/hr)				9		
Heavy Vehicles (%)	2%	2%	6%	4%	2%	6%
Turn Type				pm+pt		
Protected Phases			2	1 4		6
Permitted Phases				6		
Actuated Green, G (s)			37.5			42.0
Effective Green, g (s)			37.5			42.0
Actuated g/C Ratio			0.75			0.84
Clearance Time (s)			4.0			4.0
Vehicle Extension (s)			2.0			2.0
Lane Grp Cap (vph)			2468			1626
v/s Ratio Prot			0.54			c0.08
v/s Ratio Perm						c0.64
v/c Ratio			0.72			0.86
Uniform Delay, d1			3.4			2.3
Progression Factor			1.00			3.77
Incremental Delay, d2			1.9			4.1
Delay (s)			5.3			12.7
Level of Service			A			B
Approach Delay (s)	0.0		5.3			12.7
Approach LOS	A		A			B

Intersection Summary				
HCM Average Control Delay	8.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	89.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
18: International Blvd & 1st Ave #1#2 — 5/23/2007

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	314	78	1566	626	10	1016
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0		4.0
Lane Util. Factor	0.97		0.95	0.88		0.95
Frpb, ped/bikes	0.98		1.00	0.94		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00
Frt	0.97		1.00	0.85		1.00
Flt Protected	0.96		1.00	1.00		1.00
Satd. Flow (prot)	3241		3406	2575		3405
Flt Permitted	0.96		1.00	1.00		0.93
Satd. Flow (perm)	3241		3406	2575		3178
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	341	85	1724	680	11	1104
RTOR Reduction (vph)	10	0	0	241	0	0
Lane Group Flow (vph)	416	0	1724	439	0	1115
Confl. Peds. (#/hr)	70	65		23		
Confl. Bikes (#/hr)		12		16		
Heavy Vehicles (%)	4%	2%	6%	4%	2%	6%
Parking (#/hr)		5				
Turn Type				Perm	Perm	
Protected Phases	8		2			6
Permitted Phases				2	6	
Actuated Green, G (s)	13.0		38.3	38.3		38.3
Effective Green, g (s)	13.0		38.3	38.3		38.3
Actuated g/C Ratio	0.22		0.65	0.65		0.65
Clearance Time (s)	4.0		4.0	4.0		4.0
Vehicle Extension (s)	2.0		2.0	2.0		2.0
Lane Grp Cap (vph)	711		2200	1663		2053
v/s Ratio Prot	c0.13		c0.51			
v/s Ratio Perm				0.17		0.35
v/c Ratio	0.58		0.78	0.26		0.54
Uniform Delay, d1	20.7		7.5	4.5		5.7
Progression Factor	1.00		1.00	1.00		1.00
Incremental Delay, d2	0.8		2.9	0.4		1.0
Delay (s)	21.5		10.4	4.9		6.8
Level of Service	C		B	A		A
Approach Delay (s)	21.5		8.8			6.8
Approach LOS	C		A			A

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	69.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
19: Driveway & 1st Ave #1#2 — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	20	20	165	0	6	0	2212	1174	5	1283	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.91	0.91			0.86		1.00	0.91	
Frpb, ped/bikes		0.91		1.00	0.98			0.94		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.98			0.95		1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1598		3221	1371			5390		1768	4886	
Flt Permitted		0.98		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (perm)		1598		3221	1371			5390		1768	4886	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	22	22	179	0	7	0	2404	1276	5	1395	5
RTOR Reduction (vph)	0	12	0	0	4	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	54	0	125	57	0	0	3635	0	5	1400	0
Confl. Peds. (#/hr)	70		70	70		70			70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	6%	2%
Parking (#/hr)					5			5				
Turn Type	Split			Split						Prot		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases												
Actuated Green, G (s)		7.6		11.6	11.6			95.6		0.7	100.3	
Effective Green, g (s)		7.6		11.6	11.6			95.6		0.7	100.3	
Actuated g/C Ratio		0.06		0.09	0.09			0.73		0.01	0.76	
Clearance Time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		92		284	121			3919		9	3727	
v/s Ratio Prot		c0.03		0.04	c0.04			c0.67		0.00	c0.29	
v/s Ratio Perm												
v/c Ratio		0.58		0.44	0.47			1.24dr		0.56	0.38	
Uniform Delay, d1		60.4		56.9	57.0			15.0		65.2	5.2	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		6.0		0.4	1.1			5.1		36.0	0.0	
Delay (s)		66.4		57.3	58.1			20.1		101.3	5.2	
Level of Service		E		E	E			C		F	A	
Approach Delay (s)		66.4			57.5			20.1			5.6	
Approach LOS		E			E			C			A	

Intersection Summary				
HCM Average Control Delay	18.2	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	131.5	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	79.7%	ICU Level of Service	D	
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

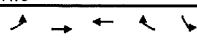
HCM Unsignalized Intersection Capacity Analysis — Measure DD
21: E 15th St #1 & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	31	531	33	0	0	0	0	227	16	10	35	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	577	36	0	0	0	0	247	17	11	38	0
Pedestrians					5			6			4	
Lane Width (ft)					0.0			12.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		201										
pX, platoon unblocked												
vC, conflicting volume	4			619			688	672	318	506	690	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			619			688	672	318	506	690	4
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	32	97	94	89	100
cM capacity (veh/h)	1611			952			297	364	675	194	356	1074

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	322	324	264	49
Volume Left	34	0	0	11
Volume Right	0	36	17	0
cSH	1611	1700	376	300
Volume to Capacity	0.02	0.19	0.70	0.16
Queue Length 95th (ft)	2	0	129	14
Control Delay (s)	0.9	0.0	34.3	19.3
Lane LOS	A		D	C
Approach Delay (s)	0.5		34.3	19.3
Approach LOS			D	C

Intersection Summary				
Average Delay	10.7			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
24: E. 10th St & 2nd Ave — 5/23/2007



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	53	293	374	40	44	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	318	407	43	48	38
Pedestrians		70	70			
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		6	6		6	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520				1002	568
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				1002	568
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				79	92
cM capacity (veh/h)	985				224	463

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	376	450	86
Volume Left	58	0	48
Volume Right	0	43	38
cSH	985	1700	291
Volume to Capacity	0.06	0.26	0.30
Queue Length 95th (ft)	5	0	30
Control Delay (s)	1.9	0.0	22.5
Lane LOS	A		C
Approach Delay (s)	1.9	0.0	22.5
Approach LOS			C

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
37: 17th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	111	0	0	884	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	121	0	0	961	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1067	659	
pX, platoon unblocked						
vC, conflicting volume	550	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	0	0			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	74	100	100			
cM capacity (veh/h)	465	1084	1622			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2
Volume Total	60	60	480	480
Volume Left	60	60	0	0
Volume Right	0	0	0	0
cSH	465	465	1700	1700
Volume to Capacity	0.13	0.13	0.28	0.28
Queue Length 95th (ft)	11	11	0	0
Control Delay (s)	13.9	13.9	0.0	0.0
Lane LOS	B	B		
Approach Delay (s)	13.9		0.0	
Approach LOS	B			

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	78.4%	ICU Level of Service	D	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Measure DD
45: 11th St & Oak St — 5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	46	0	0	935	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.95	0.95	0.92	0.92
Hourly flow rate (vph)	50	0	0	984	0	0
Pedestrians					70	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				313	241	
pX, platoon unblocked						
vC, conflicting volume	316	0	0			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	0	0			
tC, single (s)	6.9	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	641	1084	1622			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	50	246	246	246	246
Volume Left	50	0	0	0	0
Volume Right	0	0	0	0	0
cSH	641	1700	1700	1700	1700
Volume to Capacity	0.08	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	6	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	23.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis — Measure DD
22: International Blvd & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	78	477	61	51	147	19	159	260	251	7	37	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.96			0.95	
Flpb, ped/bikes		1.00			1.00			0.98			1.00	
Frt		0.99			0.99			0.95			0.94	
Flt Protected		0.99			0.99			0.99			1.00	
Satd. Flow (prot)		3158			3155			1439			1447	
Flt Permitted		0.87			0.72			0.90			0.95	
Satd. Flow (perm)		2780			2310			1310			1387	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	518	66	55	160	21	173	283	273	8	40	39
RTOR Reduction (vph)	0	22	0	0	14	0	0	14	0	0	16	0
Lane Group Flow (vph)	0	647	0	0	222	0	0	715	0	0	71	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5			5			5	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		26.0			26.0			48.0			48.0	
Effective Green, g (s)		26.0			26.0			48.0			48.0	
Actuated g/C Ratio		0.32			0.32			0.60			0.60	
Clearance Time (s)		3.0			3.0			3.0			3.0	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		904			751			786			832	
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.10			c0.55			0.05	
v/c Ratio		0.72			0.30			0.91			0.09	
Uniform Delay, d1		23.7			20.2			14.1			6.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.3			0.1			16.4			0.2	
Delay (s)		26.0			20.2			30.5			7.0	
Level of Service		C			C			C			A	
Approach Delay (s)		26.0			20.2			30.5			7.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	130.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
23: E. 12TH & 2nd Ave — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	410	750	10	20	143	87	7	65	9	116	67	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			6.0			6.0	6.0
Lane Util. Factor		0.95			0.95			1.00			1.00	1.00
Frpb, ped/bikes		1.00			0.91			0.99			1.00	0.86
Flpb, ped/bikes		0.95			1.00			0.99			0.94	1.00
Frt		1.00			0.95			0.99			1.00	0.85
Flt Protected		0.98			1.00			1.00			0.97	1.00
Satd. Flow (prot)		3074			3047			1574			1698	1360
Flt Permitted		0.73			0.84			0.97			0.76	1.00
Satd. Flow (perm)		2295			2578			1535			1338	1360
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	815	11	22	155	95	8	92	10	126	73	22
RTOR Reduction (vph)	0	1	0	0	30	0	0	4	0	0	0	13
Lane Group Flow (vph)	0	1271	0	0	242	0	0	106	0	0	199	9
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		5			5			5				
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)		61.5			61.5			19.0			19.0	19.0
Effective Green, g (s)		61.5			61.5			19.0			19.0	19.0
Actuated g/C Ratio		0.68			0.68			0.21			0.21	0.21
Clearance Time (s)		3.5			3.5			6.0			6.0	6.0
Lane Grp Cap (vph)		1568			1762			324			282	287
v/s Ratio Prot												
v/s Ratio Perm		c0.55			0.09			0.07			c0.15	0.01
v/c Ratio		0.81			0.14			0.33			0.71	0.03
Uniform Delay, d1		10.1			5.0			30.1			32.9	28.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		4.7			0.2			2.7			13.9	0.2
Delay (s)		14.8			5.1			32.6			46.8	28.4
Level of Service		B			A			C			D	C
Approach Delay (s)		14.8			5.1			32.6			44.9	
Approach LOS		B			A			C			D	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
25: Foothill Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↳	
Volume (vph)	0	0	0	74	304	48	52	354	0	0	267	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0			3.5			3.5	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					0.99			0.99			1.00	
Frt					0.98			1.00			0.99	
Flt Protected					0.99			0.99			1.00	
Satd. Flow (prot)					3187			1655			1657	
Flt Permitted					0.99			0.93			1.00	
Satd. Flow (perm)					3187			1547			1657	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	80	330	52	57	385	0	0	290	15
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	447	0	0	442	0	0	302	0
Confl. Peds. (#/hr)				70		70	70					70
Confl. Bikes (#/hr)						16						16
Parking (#/hr)		0			0			0			0	
Turn Type				Perm			Perm					
Protected Phases					1			2			2	
Permitted Phases				1			2					
Actuated Green, G (s)					27.0			31.5			31.5	
Effective Green, g (s)					27.0			31.5			31.5	
Actuated g/C Ratio					0.42			0.48			0.48	
Clearance Time (s)					3.0			3.5			3.5	
Lane Grp Cap (vph)					1324			750			803	
v/s Ratio Prot											0.18	
v/s Ratio Perm					0.14			c0.29				
v/c Ratio					0.34			0.59			0.38	
Uniform Delay, d1					12.9			12.1			10.6	
Progression Factor					1.00			1.40			1.00	
Incremental Delay, d2					0.7			2.1			1.3	
Delay (s)					13.6			19.0			11.9	
Level of Service					B			B			B	
Approach Delay (s)		0.0			13.6			19.0			11.9	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
26: International Blvd & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	25	571	45	49	529	81	69	343	70	72	355	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0			4.5			4.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3292			3236			1611			1644	
Flt Permitted		0.92			0.87			0.88			0.85	
Satd. Flow (perm)		3028			2826			1430			1414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	621	49	53	575	88	75	373	76	78	386	20
RTOR Reduction (vph)	0	9	0	0	17	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	688	0	0	699	0	0	514	0	0	482	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		29.5			29.5			28.0			28.0	
Effective Green, g (s)		29.5			29.5			28.0			28.0	
Actuated g/C Ratio		0.45			0.45			0.43			0.43	
Clearance Time (s)		3.0			3.0			4.5			4.5	
Lane Grp Cap (vph)		1374			1283			616			609	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.25			c0.36			0.34	
v/c Ratio		0.50			0.54			0.83			0.79	
Uniform Delay, d1		12.5			12.9			16.4			16.0	
Progression Factor		1.00			1.00			0.94			0.71	
Incremental Delay, d2		1.3			1.7			1.3			9.9	
Delay (s)		13.9			14.5			16.7			21.2	
Level of Service		B			B			B			C	
Approach Delay (s)		13.9			14.5			16.7			21.2	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Measure DD
27: E 12th Street & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑			↰↑↑			↑			↑	
Volume (vph)	42	786	166	37	431	75	72	397	118	60	349	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		3236			3234			1593			1630	
Flt Permitted		0.91			0.85			0.88			0.83	
Satd. Flow (perm)		2952			2748			1406			1366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	854	179	40	468	82	78	432	128	65	379	45
RTOR Reduction (vph)	0	26	0	0	20	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	1053	0	0	570	0	0	624	0	0	483	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		33.0			33.0			25.0			25.0	
Effective Green, g (s)		33.0			33.0			25.0			25.0	
Actuated g/C Ratio		0.51			0.51			0.38			0.38	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1499			1395			541			525	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.21			c0.44			0.35	
v/c Ratio		0.70			0.41			1.15			0.92	
Uniform Delay, d1		12.2			9.9			20.0			19.1	
Progression Factor		1.00			1.00			0.87			0.86	
Incremental Delay, d2		2.8			0.9			83.8			17.6	
Delay (s)		15.0			10.8			101.1			34.1	
Level of Service		B			B			F			C	
Approach Delay (s)		15.0			10.8			101.1			34.1	
Approach LOS		B			B			F			C	

Intersection Summary				
HCM Average Control Delay	37.1	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	108.9%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
28: E. 8th St & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑			↰↑↑↑			↑			↑	
Volume (vph)	318	1711	264	124	361	90	60	370	95	74	408	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00	0.93	1.00	1.00	0.93
Flpb, ped/bikes	0.96	1.00		1.00	1.00		0.98	1.00	1.00	0.97	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1692	4772		1767	4655		1727	1676	1472	1723	1676	1472
Flt Permitted	0.45	1.00		0.14	1.00		0.37	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	808	4772		266	4655		677	1676	1472	745	1676	1472
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	346	1860	287	135	392	98	65	402	103	80	443	71
RTOR Reduction (vph)	0	32	0	0	56	0	0	0	1	0	0	38
Lane Group Flow (vph)	346	2115	0	135	434	0	65	402	102	80	443	33
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	28.0	28.0		28.0	28.0		30.0	30.0	30.0	30.0	30.0	30.0
Effective Green, g (s)	28.0	28.0		28.0	28.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	348	2056		115	2005		312	774	679	344	774	679
v/s Ratio Prot		0.44			0.09			0.24			c0.26	
v/s Ratio Perm	0.43			c0.51			0.10		0.07	0.11		0.02
v/c Ratio	0.99	1.03		1.17	0.22		0.21	0.52	0.15	0.23	0.57	0.05
Uniform Delay, d1	18.4	18.5		18.5	11.6		10.4	12.4	10.1	10.6	12.8	9.6
Progression Factor	1.00	1.00		1.00	1.00		0.58	0.51	0.58	0.69	0.73	0.42
Incremental Delay, d2	46.8	27.6		138.1	0.2		0.9	1.5	0.3	0.9	1.7	0.1
Delay (s)	65.3	46.1		156.6	11.9		6.7	7.8	6.1	8.2	11.1	4.1
Level of Service	E	D		F	B		A	A	A	A	B	A
Approach Delay (s)		48.8			43.1			7.4			9.8	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM Average Control Delay	37.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	85.6%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
29: Embarcadero & 5th Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰↰↑	↱	
Volume (vph)	340	146	307	468	337	25	326	134	58	73	469	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		0.97	1.00	
Frpb, ped/bikes	1.00	0.90		1.00	0.99		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	0.96	1.00		0.95	1.00		1.00	1.00		0.93	1.00	
Frt	1.00	0.90		1.00	0.99		1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1702	2724		1675	3308		1770	1564		3181	1525	
Flt Permitted	0.50	1.00		0.42	1.00		0.12	1.00		0.62	1.00	
Satd. Flow (perm)	887	2724		741	3308		233	1564		2077	1525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	159	334	509	366	27	354	146	63	79	510	349
RTOR Reduction (vph)	0	119	0	0	9	0	0	24	0	0	38	0
Lane Group Flow (vph)	370	374	0	509	384	0	354	185	0	79	821	0
Confl. Peds. (#/hr)	70		70	70		70	70		70	70		70
Confl. Bikes (#/hr)			16			16			16			16
Parking (#/hr)		0			0			0			0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	341	1048		285	1272		115	770		1023	751	
v/s Ratio Prot		0.14			0.12			0.12			0.54	
v/s Ratio Perm	0.42			c0.69			c1.52			0.04		
v/c Ratio	1.09	0.36		1.79	0.30		3.08	0.24		0.08	1.09	
Uniform Delay, d1	20.0	14.3		20.0	13.9		16.5	9.5		8.7	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.27	1.26	
Incremental Delay, d2	73.4	0.9		367.5	0.6		957.9	0.7		0.1	55.4	
Delay (s)	93.4	15.2		387.5	14.5		974.4	10.2		11.2	76.2	
Level of Service	F	B		F	B		F	B		B	E	
Approach Delay (s)		48.7			225.0			616.4			70.7	
Approach LOS		D			F			F			E	

Intersection Summary				
HCM Average Control Delay	201.6	HCM Level of Service	F	
HCM Volume to Capacity ratio	2.52			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	120.9%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SEL	SET	SER	SER2
Lane Configurations		↰↰	↑↑↱		↰	↑↑↱			↰↰	↱		↱
Volume (vph)	10	243	1369	62	180	584	53	83	196	333	51	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Lane Util. Factor		0.97	0.95		1.00	0.95			0.97	0.95		0.95
Frpb, ped/bikes		1.00	1.00		1.00	0.96			1.00	0.98		0.91
Flpb, ped/bikes		0.98	1.00		1.00	1.00			1.00	1.00		1.00
Frt		1.00	0.99		1.00	0.87			1.00	0.98		0.86
Flt Protected		0.95	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (prot)		3297	3282		1770	3065			3433	1482		1365
Flt Permitted		0.29	1.00		0.95	1.00			0.95	1.00		1.00
Satd. Flow (perm)		991	3282		1770	3065			3433	1482		1365
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	264	1488	67	196	635	58	90	213	362	55	20
RTOR Reduction (vph)	0	0	3	0	0	9	0	0	0	0	0	13
Lane Group Flow (vph)	0	275	1552	0	196	774	0	0	213	419	0	5
Confl. Peds. (#/hr)		70		70	70		70	70	70		70	70
Confl. Bikes (#/hr)				16			16	16			16	16
Parking (#/hr)			5			5				5		
Turn Type	custom	Prot			Prot				Prot			Perm
Protected Phases		5	2		1	6			7	4		
Permitted Phases	5											4
Actuated Green, G (s)		14.0	51.0		4.0	40.0			4.0	31.6		31.6
Effective Green, g (s)		14.0	51.0		4.0	40.0			4.0	31.6		31.6
Actuated g/C Ratio		0.13	0.47		0.04	0.37			0.04	0.29		0.29
Clearance Time (s)		5.0	5.0		4.0	5.0			4.0	5.0		5.0
Vehicle Extension (s)		2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lane Grp Cap (vph)		128	1541		65	1138			126	431		397
v/s Ratio Prot			c0.47		c0.11	0.25			c0.06	c0.28		
v/s Ratio Perm		c0.28										0.00
v/c Ratio		2.15	1.01		3.02	0.68			1.69	0.97		0.01
Uniform Delay, d1		47.3	28.8		52.3	28.9			52.3	38.1		27.4
Progression Factor		1.00	1.00		1.00	1.00			1.00	1.00		1.00
Incremental Delay, d2		541.9	24.6		946.6	3.3			342.4	35.8		0.0
Delay (s)		589.2	53.4		998.9	32.2			394.7	73.8		27.4
Level of Service		F	D		F	C			F	E		C
Approach Delay (s)			133.9			225.8				177.7		
Approach LOS			F			F				F		

Intersection Summary				
HCM Average Control Delay	155.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	108.6	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	97.8%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
30: Harrison St & 27th St — 5/23/2007

Movement	NWL2	NWL	NWT	NWR
Lane Configurations				
Volume (vph)	42	19	137	188
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	5.0	5.0
Lane Util. Factor		1.00	1.00	1.00
Frpb, ped/bikes		1.00	1.00	0.91
Flpb, ped/bikes		1.00	1.00	1.00
Frt		1.00	1.00	0.85
Flt Protected		0.95	1.00	1.00
Satd. Flow (prot)		1770	1863	1437
Flt Permitted		0.95	1.00	1.00
Satd. Flow (perm)		1770	1863	1437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	21	149	204
RTOR Reduction (vph)	0	0	0	63
Lane Group Flow (vph)	0	67	149	141
Confl. Peds. (#/hr)	70	70		70
Confl. Bikes (#/hr)				16
Parking (#/hr)				
Turn Type	Prot	Prot		Perm
Protected Phases	3	3	8	
Permitted Phases				8
Actuated Green, G (s)		4.0	31.6	31.6
Effective Green, g (s)		4.0	31.6	31.6
Actuated g/C Ratio		0.04	0.29	0.29
Clearance Time (s)		4.0	5.0	5.0
Vehicle Extension (s)		2.0	2.0	2.0
Lane Grp Cap (vph)		65	542	418
v/s Ratio Prot		0.04	0.08	
v/s Ratio Perm				0.10
v/c Ratio		1.03	0.27	0.34
Uniform Delay, d1		52.3	29.7	30.3
Progression Factor		1.00	1.00	1.00
Incremental Delay, d2		120.5	0.1	0.2
Delay (s)		172.8	29.8	30.4
Level of Service		F	C	C
Approach Delay (s)			52.9	
Approach LOS			D	

Intersection Summary

Cumu(2025)+No El Embarc- PM Peak — Synchro 7 - Report Page 21

HCM Signalized Intersection Capacity Analysis — Measure DD
31: Grand Av & Harrison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	383	723	163	269	519	52	0	1428	793	0	575	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95		0.97	0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.98		1.00	0.99			1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.97		1.00	0.99			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	3433	3321		3400	3432			5036	1475		4520	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (perm)	3433	3321		3400	3432			5036	1475		4520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	416	786	177	292	564	57	0	1535	853	0	625	237
RTOR Reduction (vph)	0	21	0	0	6	0	0	0	386	0	72	0
Lane Group Flow (vph)	416	942	0	292	615	0	0	1535	467	0	790	0
Confl. Peds. (#/hr)	68		84	84		68			41			76
Confl. Bikes (#/hr)			13			10			5			1
Heavy Vehicles (%)	2%	4%	2%	3%	3%	2%	2%	3%	3%	2%	3%	2%
Parking (#/hr)											5	
Turn Type	Prot			Prot					Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases									4	4		
Actuated Green, G (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Effective Green, g (s)	14.1	28.8		24.3	40.0			26.0	26.0		26.0	
Actuated g/C Ratio	0.15	0.31		0.26	0.43			0.28	0.28		0.28	
Clearance Time (s)	4.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	
Lane Grp Cap (vph)	514	1016		878	1459			1391	408		1249	
v/s Ratio Prot	0.12	c0.28		0.09	c0.18			0.30			0.17	
v/s Ratio Perm									c0.32			
v/c Ratio	0.81	0.93		0.33	0.42			1.10	1.15		0.63	
Uniform Delay, d1	38.7	31.6		28.3	18.9			34.0	34.0		29.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	8.6	13.7		0.1	0.9			57.7	90.5		0.8	
Delay (s)	47.3	45.3		28.4	19.8			91.8	124.5		30.6	
Level of Service	D	D		C	B			F	F		C	
Approach Delay (s)		45.9			22.6			103.5			30.6	
Approach LOS		D			C			F			C	

Intersection Summary

HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	112.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Cumu(2025)+No El Embarc- PM Peak — Synchro 7 - Report Page 22

HCM Signalized Intersection Capacity Analysis — Measure DD
32: 20th St #3 & Lakeside Dr — 5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1009	170	563	512	121	957
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	0.98		1.00	1.00	0.91	0.89
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.86	0.85
Flt Protected	1.00		0.95	1.00	0.99	1.00
Satd. Flow (prot)	4724		3367	4893	2854	1278
Flt Permitted	1.00		0.95	1.00	0.99	1.00
Satd. Flow (perm)	4724		3367	4893	2854	1278
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1097	185	634	557	132	1040
RTOR Reduction (vph)	34	0	0	0	329	329
Lane Group Flow (vph)	1248	0	634	557	323	191
Confl. Peds. (#/hr)			70	70	70	70
Confl. Bikes (#/hr)			16			16
Heavy Vehicles (%)	6%	4%	4%	6%	4%	2%
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	23.0		16.0	43.0	19.0	19.0
Effective Green, g (s)	23.0		16.0	43.0	19.0	19.0
Actuated g/C Ratio	0.33		0.23	0.61	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1552		770	3006	775	347
v/s Ratio Prot	c0.26		c0.19	0.11	0.11	
v/s Ratio Perm						c0.15
v/c Ratio	0.80		0.82	0.19	0.42	0.55
Uniform Delay, d1	21.4		25.7	5.9	21.0	21.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7		9.7	0.1	1.7	6.2
Delay (s)	28.9		35.4	6.0	22.6	28.0
Level of Service	C		D	A	C	C
Approach Delay (s)	28.9			21.6	25.0	
Approach LOS	C			C	C	

Intersection Summary

HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Cumu(2025)+No El Embarc- PM Peak — Synchro 7 - Report Page 23

HCM Signalized Intersection Capacity Analysis — Measure DD
33: 20th St #3 & Driveway — 5/23/2007

Movement	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBR	SEPZ
Lane Configurations											
Volume (vph)	413	41	149	370	114	270	75	0	743	30	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.95	1.00			0.95	0.95	1.00	1.00
Frpb, ped/bikes	0.99		1.00	1.00	0.84			0.97	0.92	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	0.85			0.94	1.00	0.86	0.86
Flt Protected	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (prot)	4795		1770	3406	1337			1568	1425	1611	1611
Flt Permitted	1.00		0.95	1.00	1.00			0.97	1.00	1.00	1.00
Satd. Flow (perm)	4795		1770	3406	1337			1568	1425	1611	1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	449	45	162	402	124	293	82	0	808	33	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	32	299	0	0
Lane Group Flow (vph)	494	0	162	402	124	0	0	577	275	33	11
Confl. Peds. (#/hr)			70	70		70	70		70		
Confl. Bikes (#/hr)			16		16				16		
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5		
Turn Type			Prot		Perm	Perm	Split		Perm	custom	Free
Protected Phases	1		2	6			8	8		5	
Permitted Phases					6	8			8		Free
Actuated Green, G (s)	17.0		11.0	23.0	23.0			30.0	30.0	5.0	70.0
Effective Green, g (s)	17.0		11.0	23.0	23.0			30.0	30.0	5.0	70.0
Actuated g/C Ratio	0.24		0.16	0.33	0.33			0.43	0.43	0.07	1.00
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	
Lane Grp Cap (vph)	1165		278	1119	439			672	611	115	1611
v/s Ratio Prot	c0.10		c0.09	0.12				c0.37		0.02	
v/s Ratio Perm					0.09				0.19		0.01
v/c Ratio	0.42		0.58	0.36	0.28			0.86	0.45	0.29	0.01
Uniform Delay, d1	22.4		27.4	17.9	17.4			18.1	14.2	30.8	0.0
Progression Factor	1.00		0.84	0.75	0.75			1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1		8.5	0.9	1.6			13.4	2.4	6.2	0.0
Delay (s)	23.5		31.6	14.4	14.6			31.5	16.6	37.0	0.0
Level of Service	C		C	B	B			C	B	D	A
Approach Delay (s)	23.5			18.5				24.3			
Approach LOS	C			B				C			

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Cumu(2025)+No El Embarc- PM Peak — Synchro 7 - Report Page 24

HCM Signalized Intersection Capacity Analysis
34: Jackson St & Lakeside Dr

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	32	14	712	630	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1502			1628	1555	
Flt Permitted	0.96			0.98	1.00	
Satd. Flow (perm)	1502			1603	1555	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	266	35	15	774	663	173
RTOR Reduction (vph)	9	0	0	0	17	0
Lane Group Flow (vph)	292	0	0	789	819	0
Confl. Peds. (#/hr)	4	12	25			25
Confl. Bikes (#/hr)		2				16
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%
Parking (#/hr)	5			5	5	
Turn Type			custom			
Protected Phases	4			6		
Permitted Phases			2	2		
Actuated Green, G (s)	14.0			34.0	34.0	
Effective Green, g (s)	14.0			34.0	34.0	
Actuated g/C Ratio	0.25			0.62	0.62	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	382			991	961	
v/s Ratio Prot	c0.19				c0.53	
v/s Ratio Perm				0.49		
v/c Ratio	0.76			0.80	0.85	
Uniform Delay, d1	19.0			7.9	8.5	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	13.6			6.6	9.4	
Delay (s)	32.5			14.5	17.9	
Level of Service	C			B	B	
Approach Delay (s)	32.5			14.5	17.9	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Lakeside Dr & 19th St

Measure DD
5/23/2007

Movement	SBL	SBR	SBR2	SCL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	0	601	15	0	0	0	0	137	723	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5						3.0	3.0		
Lane Util. Factor		*0.95						0.95	*0.95		
Frpb, ped/bikes		1.00						1.00	1.00		
Flpb, ped/bikes		1.00						1.00	1.00		
Frt		1.00						1.00	1.00		
Flt Protected		1.00						1.00	1.00		
Satd. Flow (prot)		1548						3318	1548		
Flt Permitted		1.00						1.00	1.00		
Satd. Flow (perm)		1548						3318	1548		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92
Adj. Flow (vph)	0	653	16	0	0	0	0	146	769	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	669	0	0	0	0	0	146	769	0	0
Confl. Peds. (#/hr)			11								
Confl. Bikes (#/hr)			9								
Parking (#/hr)		5						5	5		
Turn Type		custom							custom		
Protected Phases		3						2			
Permitted Phases									2 3		
Actuated Green, G (s)		17.0						21.5	45.0		
Effective Green, g (s)		17.0						21.5	41.5		
Actuated g/C Ratio		0.38						0.48	0.92		
Clearance Time (s)		3.5						3.0			
Lane Grp Cap (vph)		585						1585	1428		
v/s Ratio Prot		c0.43						0.04			
v/s Ratio Perm									c0.50		
v/c Ratio		1.14						0.09	0.54		
Uniform Delay, d1		14.0						6.4	0.3		
Progression Factor		1.00						1.00	1.00		
Incremental Delay, d2		83.6						0.1	1.5		
Delay (s)		97.6						6.5	1.7		
Level of Service		F						A	A		
Approach Delay (s)	97.6				0.0			2.5		0.0	
Approach LOS	F				A			A		A	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
36: 17th St & Madison St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	66	532	0	0	0	0	0	0	49	695	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5									3.0	
Lane Util. Factor		0.95									0.91	
Frpb, ped/bikes		0.95									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.87									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		2698									4813	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		2698									4813	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	578	0	0	0	0	0	0	53	755	0
RTOR Reduction (vph)	0	93	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	557	0	0	0	0	0	0	0	0	791	0
Confl. Peds. (#/hr)			38							14		
Confl. Bikes (#/hr)			8									
Parking (#/hr)		10			0			0			10	
Turn Type									Perm			
Protected Phases		2									1	
Permitted Phases									1			
Actuated Green, G (s)		16.3									22.2	
Effective Green, g (s)		16.3									22.2	
Actuated g/C Ratio		0.36									0.49	
Clearance Time (s)		3.5									3.0	
Lane Grp Cap (vph)		977									2374	
v/s Ratio Prot		c0.21										
v/s Ratio Perm											0.16	
v/c Ratio		1.02dr									0.33	
Uniform Delay, d1		11.5									6.9	
Progression Factor		1.00									2.35	
Incremental Delay, d2		2.4									0.1	
Delay (s)		13.9									16.4	
Level of Service		B									B	
Approach Delay (s)		13.9			0.0			0.0			16.4	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	15.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
38: 14th St & Madison St

Measure DD
5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	640	64	47	459	0	0	0	0	684	505	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.92	0.97	
Frt		0.99			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	0.98	
Satd. Flow (prot)		3133			3238					1295	3011	
Flt Permitted		1.00			0.86					0.95	0.98	
Satd. Flow (perm)		3133			2800					1295	3011	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	696	70	51	499	0	0	0	0	743	549	38
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	749	0	0	550	0	0	0	0	438	885	0
Confl. Peds. (#/hr)			119	119						102		65
Confl. Bikes (#/hr)			12									5
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5			5				0	5	5	
Turn Type				Perm							Perm	
Protected Phases		2			2						1	
Permitted Phases				2						1		
Actuated Green, G (s)		21.0			21.0					17.0	17.0	
Effective Green, g (s)		21.0			21.0					17.0	17.0	
Actuated g/C Ratio		0.47			0.47					0.38	0.38	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Lane Grp Cap (vph)		1462			1307					489	1137	
v/s Ratio Prot		c0.24										
v/s Ratio Perm					0.20					c0.34	0.29	
v/c Ratio		0.51			0.42					0.90	0.78	
Uniform Delay, d1		8.4			8.0					13.2	12.3	
Progression Factor		1.00			1.00					1.47	1.49	
Incremental Delay, d2		1.3			1.0					20.1	4.8	
Delay (s)		9.7			9.0					39.4	23.1	
Level of Service		A			A					D	C	
Approach Delay (s)		9.7			9.0			0.0			28.5	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
39: 14th St & Lakeside Dr — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑			↑↑	↱		↰↑↑↑				
Volume (vph)	89	1264	0	0	335	343	129	445	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0		3.5				
Lane Util. Factor		0.95			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.90		1.00				
Flpb, ped/bikes		1.00			1.00	1.00		0.98				
Frt		1.00			1.00	0.85		0.99				
Flt Protected		1.00			1.00	1.00		0.99				
Satd. Flow (prot)		3180			3471	1424		4652				
Flt Permitted		0.89			1.00	1.00		0.99				
Satd. Flow (perm)		2850			3471	1424		4652				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	1374	0	0	364	373	140	484	24	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	33	0	7	0	0	0	0
Lane Group Flow (vph)	0	1471	0	0	364	340	0	641	0	0	0	0
Confl. Peds. (#/hr)	85					85	106		66			
Confl. Bikes (#/hr)						29			20			
Heavy Vehicles (%)	2%	6%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		5						10			0	
Turn Type	Perm					Perm	Perm					
Protected Phases		2			6			8				
Permitted Phases	2					6	8					
Actuated Green, G (s)		38.7			38.7	38.7		13.6				
Effective Green, g (s)		38.7			38.7	38.7		13.6				
Actuated g/C Ratio		0.64			0.64	0.64		0.22				
Clearance Time (s)		5.0			5.0	5.0		3.5				
Vehicle Extension (s)		2.0			2.0	2.0		2.0				
Lane Grp Cap (vph)		1814			2209	906		1041				
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.52				0.24		0.14				
v/c Ratio		0.81			0.16	0.38		0.62				
Uniform Delay, d1		8.3			4.5	5.3		21.2				
Progression Factor		1.00			1.00	1.00		1.00				
Incremental Delay, d2		4.1			0.2	1.2		0.8				
Delay (s)		12.4			4.6	6.5		22.0				
Level of Service		B			A	A		C				
Approach Delay (s)		12.4			5.6			22.0			0.0	
Approach LOS		B			A			C			A	

Intersection Summary				
HCM Average Control Delay	12.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	94.3%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
40: 13th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑									↰↑↑↑	
Volume (vph)	0	672	177	0	0	0	0	0	0	105	679	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.97									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5884									4758	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5884									4758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	730	192	0	0	0	0	0	0	114	738	0
RTOR Reduction (vph)	0	43	0	0	0	0	0	0	0	0	46	0
Lane Group Flow (vph)	0	879	0	0	0	0	0	0	0	0	806	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0				0		10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		21.0									17.0	
Effective Green, g (s)		21.0									17.0	
Actuated g/C Ratio		0.47									0.38	
Clearance Time (s)		4.0									3.0	
Lane Grp Cap (vph)		2746									1797	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.17	
v/c Ratio		0.32									0.45	
Uniform Delay, d1		7.5									10.5	
Progression Factor		1.00									1.38	
Incremental Delay, d2		0.3									0.7	
Delay (s)		7.8									15.2	
Level of Service		A									B	
Approach Delay (s)		7.8			0.0			0.0			15.2	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	11.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	44.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
41: 13th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑						↑↑↑	↱			
Volume (vph)	77	666	0	0	0	0	0	534	331	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5						3.0	3.0			
Lane Util. Factor	1.00	0.91						0.91	1.00			
Frpb, ped/bikes	1.00	1.00						1.00	0.93			
Flpb, ped/bikes	0.97	1.00						1.00	1.00			
Frt	1.00	1.00						1.00	0.85			
Flt Protected	0.95	1.00						1.00	1.00			
Satd. Flow (prot)	1508	4873						4831	1474			
Flt Permitted	0.95	1.00						1.00	1.00			
Satd. Flow (perm)	1508	4873						4831	1474			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	84	724	0	0	0	0	0	580	360	0	0	0
RTOR Reduction (vph)	48	0	0	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	36	724	0	0	0	0	0	580	291	0	0	0
Confl. Peds. (#/hr)	37								66			
Confl. Bikes (#/hr)									12			
Parking (#/hr)	5	5			0			10			0	
Turn Type	Perm								Perm			
Protected Phases		2						1				
Permitted Phases	2								1			
Actuated Green, G (s)	19.5	19.5						19.0	19.0			
Effective Green, g (s)	19.5	19.5						19.0	19.0			
Actuated g/C Ratio	0.43	0.43						0.42	0.42			
Clearance Time (s)	3.5	3.5						3.0	3.0			
Lane Grp Cap (vph)	653	2112						2040	622			
v/s Ratio Prot		c0.15						0.12				
v/s Ratio Perm	0.02								c0.20			
v/c Ratio	0.06	0.34						0.28	0.47			
Uniform Delay, d1	7.4	8.5						8.5	9.4			
Progression Factor	0.93	0.83						2.30	2.81			
Incremental Delay, d2	0.2	0.4						0.3	2.0			
Delay (s)	7.0	7.5						19.9	28.3			
Level of Service	A	A						B	C			
Approach Delay (s)		7.4			0.0			23.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary				
HCM Average Control Delay	15.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.5	
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
42: 12th St #2 & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	256	804	0	0	0	0	0	602	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					5900						4734	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					5900						4734	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	278	874	0	0	0	0	0	654	62
RTOR Reduction (vph)	0	0	0	0	59	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	1093	0	0	0	0	0	691	0
Confl. Peds. (#/hr)				53								74
Confl. Bikes (#/hr)												9
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10				0		10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					21.0						17.0	
Effective Green, g (s)					21.0						17.0	
Actuated g/C Ratio					0.47						0.38	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2753						1788	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.19							
v/c Ratio					0.40						0.39	
Uniform Delay, d1					7.9						10.2	
Progression Factor					0.52						1.70	
Incremental Delay, d2					0.4						0.6	
Delay (s)					4.5						17.9	
Level of Service					A						B	
Approach Delay (s)		0.0			4.5			0.0			17.9	
Approach LOS		A			A			A			B	

Intersection Summary				
HCM Average Control Delay	9.6	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0	
Intersection Capacity Utilization	35.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
43: 12th St #2 & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑			↑↑↑				
Volume (vph)	0	0	0	0	951	25	436	864	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0			3.5				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					1.00			1.00				
Flt Protected					1.00			0.98				
Satd. Flow (prot)					4674			5006				
Flt Permitted					1.00			0.98				
Satd. Flow (perm)					4674			5006				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1045	27	469	929	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1066	0	0	1374	0	0	0	0
Confl. Peds. (#/hr)						34	99					
Confl. Bikes (#/hr)						11						
Heavy Vehicles (%)	2%	2%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0			10			10			0	
Turn Type							Prot					
Protected Phases					1		2					
Permitted Phases								2				
Actuated Green, G (s)					19.0			17.5				
Effective Green, g (s)					19.0			17.5				
Actuated g/C Ratio					0.42			0.39				
Clearance Time (s)					5.0			3.5				
Lane Grp Cap (vph)					1973			2297				
v/s Ratio Prot					c0.23							
v/s Ratio Perm								c0.23				
v/c Ratio					0.54			0.60				
Uniform Delay, d1					9.7			11.0				
Progression Factor					1.00			1.57				
Incremental Delay, d2					1.1			1.1				
Delay (s)					10.8			18.3				
Level of Service					B			B				
Approach Delay (s)		0.0			10.8			18.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary				
HCM Average Control Delay	15.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	50.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
44: 11th St & Madison St — 5/23/2007

Movement	SBL	SBT	SBR	SER								
Lane Configurations		↑↑↑		↑↑↑								
Volume (vph)	57	848	46	1296	151							
Ideal Flow (vphpl)	1900	1900	1900	1900	1900							
Total Lost time (s)		5.0	5.0	5.0								
Lane Util. Factor		0.91	1.00	0.91								
Frpb, ped/bikes		1.00	1.00	0.99								
Flpb, ped/bikes		1.00	1.00	1.00								
Frt		1.00	1.00	0.98								
Flt Protected		1.00	0.95	1.00								
Satd. Flow (prot)		4797	1548	4597								
Flt Permitted		1.00	0.95	1.00								
Satd. Flow (perm)		4797	1548	4597								
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92							
Adj. Flow (vph)	62	922	50	1409	164							
RTOR Reduction (vph)	0	0	0	25	0							
Lane Group Flow (vph)	0	984	50	1548	0							
Confl. Peds. (#/hr)	70				70							
Confl. Bikes (#/hr)					16							
Heavy Vehicles (%)	2%	2%	2%	6%	2%							
Parking (#/hr)		10	5	5								
Turn Type	Perm		custom									
Protected Phases		2	1	1								
Permitted Phases	2		1									
Actuated Green, G (s)		17.0	18.0	18.0								
Effective Green, g (s)		17.0	18.0	18.0								
Actuated g/C Ratio		0.36	0.40	0.40								
Clearance Time (s)		5.0	5.0	5.0								
Lane Grp Cap (vph)		1812	619	1839								
v/s Ratio Prot			0.03	c0.34								
v/s Ratio Perm		0.21										
v/c Ratio		0.54	0.08	0.84								
Uniform Delay, d1		11.0	8.4	12.2								
Progression Factor		0.98	1.00	1.00								
Incremental Delay, d2		1.1	0.3	4.9								
Delay (s)		11.9	8.6	17.1								
Level of Service		B	A	B								
Approach Delay (s)		11.9		16.8								
Approach LOS		B		B								

Intersection Summary				
HCM Average Control Delay	15.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	10.0	
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
46: E. 10th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑						↑↑↑	
Volume (vph)	0	0	0	162	367	0	0	0	0	94	678	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.0						3.0	
Lane Util. Factor					0.95						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.98						1.00	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3162						4731	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3162						4731	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	176	399	0	0	0	0	102	954	66
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	0	0	0	575	0	0	0	0	0	1107	0
Confl. Peds. (#/hr)				70						70		70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm						Perm		
Protected Phases					8						6	
Permitted Phases				8						6		
Actuated Green, G (s)					16.0						23.0	
Effective Green, g (s)					16.0						23.0	
Actuated g/C Ratio					0.36						0.51	
Clearance Time (s)					3.0						3.0	
Lane Grp Cap (vph)					1124						2418	
v/s Ratio Prot												
v/s Ratio Perm					0.18						0.23	
v/c Ratio					0.51						0.46	
Uniform Delay, d1					11.4						7.0	
Progression Factor					0.97						0.28	
Incremental Delay, d2					1.1						0.5	
Delay (s)					12.1						2.5	
Level of Service					B						A	
Approach Delay (s)		0.0			12.1			0.0			2.5	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	5.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.48			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0	
Intersection Capacity Utilization	42.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
47: E. 10th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑			↑↑↑				
Volume (vph)	2	66	0	0	352	110	192	857	81	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.98			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		3311			1546			5980				
Flt Permitted		0.94			1.00			0.99				
Satd. Flow (perm)		3132			1546			5980				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	72	0	0	383	120	209	932	88	0	0	0
RTOR Reduction (vph)	0	0	0	0	25	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	74	0	0	478	0	0	1203	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		15.0			15.0			22.0				
Effective Green, g (s)		15.0			15.0			22.0				
Actuated g/C Ratio		0.33			0.33			0.49				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1044			515			2924				
v/s Ratio Prot					c0.31							
v/s Ratio Perm		0.02						0.20				
v/c Ratio		0.07			0.93			0.41				
Uniform Delay, d1		10.2			14.5			7.4				
Progression Factor		1.86			1.00			0.99				
Incremental Delay, d2		0.1			25.2			0.4				
Delay (s)		19.2			39.7			7.0				
Level of Service		B			D			A				
Approach Delay (s)		19.2			39.7			7.0			0.0	
Approach LOS		B			D			A			A	

Intersection Summary				
HCM Average Control Delay	16.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	51.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
48: 8th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰↑↑↑						↑↑↑↱	
Volume (vph)	0	0	0	154	472	0	0	0	0	0	995	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0						3.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6010						4723	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6010						4723	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	167	513	0	0	0	0	0	1082	128
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	0	0	0	650	0	0	0	0	0	1177	0
Confl. Peds. (#/hr)				70								70
Confl. Bikes (#/hr)												16
Parking (#/hr)		0			10			0			10	
Turn Type				Perm								
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					17.0						21.0	
Effective Green, g (s)					17.0						21.0	
Actuated g/C Ratio					0.38						0.47	
Clearance Time (s)					4.0						3.0	
Lane Grp Cap (vph)					2270						2204	
v/s Ratio Prot											c0.25	
v/s Ratio Perm					0.11							
v/c Ratio					0.29						0.53	
Uniform Delay, d1					9.8						8.5	
Progression Factor					1.12						0.90	
Incremental Delay, d2					0.3						0.9	
Delay (s)					11.2						8.5	
Level of Service					B						A	
Approach Delay (s)		0.0			11.2			0.0			8.5	
Approach LOS		A			B			A			A	

Intersection Summary				
HCM Average Control Delay	9.5	HCM Level of Service		A
HCM Volume to Capacity ratio	0.42			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	38.2%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
49: 8th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	420	112	194	903	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.98			1.00				
Flpb, ped/bikes					1.00			0.99				
Frt					0.97			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5883			6060				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5883			6060				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	457	122	211	982	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	86	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	550	0	0	1107	0	0	0	0
Confl. Peds. (#/hr)						70	70					
Confl. Bikes (#/hr)						16						
Parking (#/hr)		0			10			10			0	
Turn Type							Perm					
Protected Phases					2			1				
Permitted Phases							1					
Actuated Green, G (s)					18.0			19.0				
Effective Green, g (s)					18.0			19.0				
Actuated g/C Ratio					0.40			0.42				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					2353			2559				
v/s Ratio Prot					c0.09							
v/s Ratio Perm								0.18				
v/c Ratio					0.23			0.43				
Uniform Delay, d1					8.9			9.2				
Progression Factor					1.00			1.98				
Incremental Delay, d2					0.2			0.0				
Delay (s)					9.2			18.2				
Level of Service					A			B				
Approach Delay (s)		0.0			9.2			18.2			0.0	
Approach LOS		A			A			B			A	

Intersection Summary				
HCM Average Control Delay	15.3	HCM Level of Service		B
HCM Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization	37.7%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
50: 7th St & Madison St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑↑	
Volume (vph)	0	1576	461	0	0	0	0	0	0	312	957	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0									4.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.98									1.00	
Flpb, ped/bikes		1.00									0.99	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5860									4711	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5860									4711	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1713	523	0	0	0	0	0	0	339	1040	0
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	2218	0	0	0	0	0	0	0	0	1376	0
Confl. Peds. (#/hr)			70							70		
Confl. Bikes (#/hr)			16									
Parking (#/hr)		10			0			0			10	
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		20.0									18.0	
Effective Green, g (s)		20.0									18.0	
Actuated g/C Ratio		0.44									0.40	
Clearance Time (s)		3.0									4.0	
Lane Grp Cap (vph)		2604									1884	
v/s Ratio Prot		c0.38										
v/s Ratio Perm											0.29	
v/c Ratio		0.85									0.73	
Uniform Delay, d1		11.2									11.4	
Progression Factor		1.00									1.92	
Incremental Delay, d2		3.8									2.3	
Delay (s)		14.9									24.2	
Level of Service		B									C	
Approach Delay (s)		14.9			0.0			0.0			24.2	
Approach LOS		B			A			A			C	

Intersection Summary				
HCM Average Control Delay	18.5	HCM Level of Service		B
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		7.0
Intersection Capacity Utilization	63.5%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
51: 7th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↑						↑↑↑↱				
Volume (vph)	204	1498	0	0	0	0	0	900	1165	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.96				
Flpb, ped/bikes		0.99						1.00				
Frt		1.00						0.91				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6092						4239				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6092						4239				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	1628	0	0	0	0	0	978	1266	0	0	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1825	0	0	0	0	0	2264	0	0	0	0
Confl. Peds. (#/hr)	70								70			
Confl. Bikes (#/hr)									16			
Parking (#/hr)		10			0			10			0	
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2437						1696				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.30										
v/c Ratio		0.75						2.44dr				
Uniform Delay, d1		11.6						13.5				
Progression Factor		1.49						1.00				
Incremental Delay, d2		1.1						154.7				
Delay (s)		18.3						168.2				
Level of Service		B						F				
Approach Delay (s)		18.3			0.0			168.2			0.0	
Approach LOS		B			A			F			A	

Intersection Summary				
HCM Average Control Delay	100.9	HCM Level of Service		F
HCM Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)		9.0
Intersection Capacity Utilization	79.2%	ICU Level of Service		D
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
52: Lakeshore & 1st Ave #2

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	10	10	1334	1209	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	0.95	1.00
Frpb, ped/bikes	0.95			1.00	1.00	0.82
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.93			1.00	1.00	0.85
Flt Protected	0.98			1.00	1.00	1.00
Satd. Flow (prot)	1603			3405	3406	1294
Flt Permitted	0.98			0.94	1.00	1.00
Satd. Flow (perm)	1603			3218	3406	1294
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	1450	1314	11
RTOR Reduction (vph)	10	0	0	0	0	3
Lane Group Flow (vph)	12	0	0	1461	1314	8
Confl. Peds. (#/hr)	70	70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	2%	2%	2%	6%	6%	2%
Turn Type			pm+pt			Perm
Protected Phases	4		5	2	6	
Permitted Phases			2			6
Actuated Green, G (s)	4.5			37.5	37.5	37.5
Effective Green, g (s)	4.5			37.5	37.5	37.5
Actuated g/C Ratio	0.09			0.75	0.75	0.75
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	144			2414	2555	971
v/s Ratio Prot	c0.01				0.39	
v/s Ratio Perm				c0.45		0.01
v/c Ratio	0.08			0.61	0.51	0.01
Uniform Delay, d1	20.9			2.9	2.5	1.6
Progression Factor	1.00			0.27	0.79	1.12
Incremental Delay, d2	0.1			0.2	0.7	0.0
Delay (s)	20.9			1.0	2.7	1.8
Level of Service	C			A	A	A
Approach Delay (s)	20.9			1.0	2.7	
Approach LOS	C			A	A	

Intersection Summary				
HCM Average Control Delay	1.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	63.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
53: 12th St #1#2 & Convention Ctr

Measure DD
5/23/2007

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	3376	10	0	1444	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.91		1.00
Frpb, ped/bikes	1.00			1.00		0.87
Flpb, ped/bikes	1.00			1.00		1.00
Frt	1.00			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4890			4893		1409
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4890			4893		1409
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3670	11	0	1570	0	11
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	3681	0	0	1570	0	11
Confl. Peds. (#/hr)		70				70
Confl. Bikes (#/hr)		16				16
Heavy Vehicles (%)	6%	2%	2%	6%	2%	2%
Turn Type						custom
Protected Phases	2			6		
Permitted Phases						8
Actuated Green, G (s)	38.8			38.8		3.2
Effective Green, g (s)	38.8			38.8		3.2
Actuated g/C Ratio	0.78			0.78		0.06
Clearance Time (s)	4.0			4.0		4.0
Vehicle Extension (s)	2.0			2.0		2.0
Lane Grp Cap (vph)	3795			3797		90
v/s Ratio Prot	c0.75			0.32		
v/s Ratio Perm						c0.01
v/c Ratio	0.97			0.41		0.12
Uniform Delay, d1	5.1			1.8		22.1
Progression Factor	0.82			1.00		1.00
Incremental Delay, d2	1.3			0.3		0.2
Delay (s)	5.4			2.2		22.3
Level of Service	A			A		C
Approach Delay (s)	5.4			2.2	22.3	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	4.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	84.7%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
54: 11th-12th St #1#2 & 14th St

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	1253	624	620	2133	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0	
Lane Util. Factor		0.76	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	1.00	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		3474	3367	3254	4988	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		3474	3367	3254	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1362	896	674	2318	0
RTOR Reduction (vph)	0	2	0	0	0	0
Lane Group Flow (vph)	0	1360	896	674	2318	0
Confl. Peds. (#/hr)		70	70			
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	6%	4%	4%	4%	2%
Parking (#/hr)				5		
Turn Type		Over	Prot			
Protected Phases		5	5	2	6	
Permitted Phases						
Actuated Green, G (s)		18.0	18.0	50.0	24.0	
Effective Green, g (s)		18.0	18.0	50.0	24.0	
Actuated g/C Ratio		0.36	0.36	1.00	0.48	
Clearance Time (s)		4.0	4.0	4.0	4.0	
Vehicle Extension (s)		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		1251	1212	3254	2394	
v/s Ratio Prot		c0.39	0.27	0.21	c0.46	
v/s Ratio Perm						
v/c Ratio		1.09	0.74	0.21	0.97	
Uniform Delay, d1		16.0	14.0	0.0	12.6	
Progression Factor		1.00	0.82	1.00	0.86	
Incremental Delay, d2		52.6	2.0	0.1	7.6	
Delay (s)		68.6	13.4	0.1	18.4	
Level of Service		E	B	A	B	
Approach Delay (s)	68.6			7.7	18.4	
Approach LOS	E			A	B	

Intersection Summary				
HCM Average Control Delay	28.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	87.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
55: 13th St & 14th St

Measure DD
5/23/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	847	0	678	1286	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	
Lane Util. Factor		0.76		0.95	0.95	
Frpb, ped/bikes		0.86		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	
Frt		0.85		1.00	1.00	
Flt Protected		1.00		1.00	1.00	
Satd. Flow (prot)		3090		3471	3254	
Flt Permitted		1.00		1.00	1.00	
Satd. Flow (perm)		3090		3471	3254	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	921	0	737	1398	0
RTOR Reduction (vph)	0	45	0	0	0	0
Lane Group Flow (vph)	0	876	0	737	1398	0
Confl. Peds. (#/hr)		70				
Confl. Bikes (#/hr)		16				
Heavy Vehicles (%)	2%	2%	2%	4%	4%	2%
Parking (#/hr)					5	
Turn Type		custom				
Protected Phases				2	6	
Permitted Phases		4				
Actuated Green, G (s)		15.6		26.4	26.4	
Effective Green, g (s)		15.6		26.4	26.4	
Actuated g/C Ratio		0.31		0.53	0.53	
Clearance Time (s)		4.0		4.0	4.0	
Vehicle Extension (s)		2.0		2.0	2.0	
Lane Grp Cap (vph)		964		1833	1718	
v/s Ratio Prot				0.21	c0.43	
v/s Ratio Perm		c0.28				
v/c Ratio		0.91		0.40	0.81	
Uniform Delay, d1		16.5		7.1	9.8	
Progression Factor		1.00		1.13	1.00	
Incremental Delay, d2		11.9		0.7	4.4	
Delay (s)		28.4		8.8	14.1	
Level of Service		C		A	B	
Approach Delay (s)	28.4			8.8	14.1	
Approach LOS	C			A	B	

Intersection Summary				
HCM Average Control Delay	17.1	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.9%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	443	349	0	0	0	0	483	197	374	1105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.97						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4345						3539	1329	1610	3173	
Flt Permitted		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4345						3539	1329	1610	3173	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	457	360	0	0	0	0	525	214	407	1201	0
RTOR Reduction (vph)	0	69	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1177	0	0	0	0	0	525	214	366	1242	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.5						18.5	106.0	44.0	44.0	
Effective Green, g (s)		30.5						18.5	106.0	44.0	44.0	
Actuated g/C Ratio		0.29						0.17	1.00	0.42	0.42	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1250						618	1329	668	1317	
v/s Ratio Prot								c0.15		0.23	c0.39	
v/s Ratio Perm		0.27							0.16			
v/c Ratio		0.94						0.85	0.16	0.55	0.94	
Uniform Delay, d1		36.9						42.4	0.0	23.5	29.8	
Progression Factor		1.00						1.00	1.00	0.75	0.77	
Incremental Delay, d2		14.8						13.7	0.3	1.3	7.3	
Delay (s)		51.7						56.1	0.3	19.0	30.3	
Level of Service		D						E	A	B	C	
Approach Delay (s)		51.7			0.0			39.9			27.7	
Approach LOS		D			A			D			C	

Intersection Summary				
HCM Average Control Delay	38.6	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	81.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	92	443	1102	165	307	268	0	0	584	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.90		1.00	1.00	0.97	1.00	1.00			0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86		1.00	1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1199		1770	3539	1338	3433	1863			2874	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1199		1770	3539	1338	3433	1863			2874	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	100	461	1148	172	334	280	0	0	621	536
RTOR Reduction (vph)	0	94	0	0	0	90	0	0	0	0	100	0
Lane Group Flow (vph)	97	17	0	461	1148	82	334	280	0	0	1057	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0		24.7	24.7	24.7	8.0	38.8			26.8	
Effective Green, g (s)	5.0	5.0		24.7	24.7	24.7	8.0	38.8			26.8	
Actuated g/C Ratio	0.05	0.06		0.31	0.31	0.31	0.10	0.48			0.34	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	105	75		546	1093	413	343	904			963	
v/s Ratio Prot	c0.06	0.01		0.26	c0.32		c0.10	0.15			c0.37	
v/s Ratio Perm						0.06						
v/c Ratio	0.92	0.23		0.84	1.05	0.20	0.97	0.31			1.10	
Uniform Delay, d1	37.3	35.7		25.9	27.6	20.4	35.9	12.5			26.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	62.8	0.6		14.8	41.4	1.1	41.1	0.1			59.3	
Delay (s)	100.1	36.2		40.6	69.1	21.4	77.0	12.6			85.9	
Level of Service	F	D		D	E	C	E	B			F	
Approach Delay (s)		66.0			57.1			47.6			85.9	
Approach LOS		E			E			D			F	

Intersection Summary				
HCM Average Control Delay	64.9	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	96.5%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
47: E. 10th St & Oak St — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	61	0	0	654	150	114	773	103	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			0.86				
Frpb, ped/bikes		1.00			0.99			0.99				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		3296			1565			5941				
Flt Permitted		0.83			1.00			0.99				
Satd. Flow (perm)		2765			1565			5941				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	66	0	0	711	163	124	840	112	0	0	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	76	0	0	864	0	0	1031	0	0	0	0
Confl. Peds. (#/hr)	70					70	70		70			
Confl. Bikes (#/hr)						16			16			
Parking (#/hr)		5			5			10			0	
Turn Type	Perm						Perm					
Protected Phases		2			2			1				
Permitted Phases	2						1					
Actuated Green, G (s)		22.0			22.0			15.0				
Effective Green, g (s)		22.0			22.0			15.0				
Actuated g/C Ratio		0.49			0.49			0.33				
Clearance Time (s)		4.0			4.0			4.0				
Lane Grp Cap (vph)		1352			765			1980				
v/s Ratio Prot					c0.55							
v/s Ratio Perm		0.03						0.17				
v/c Ratio		0.06			1.13			0.52				
Uniform Delay, d1		6.0			11.5			12.1				
Progression Factor		0.28			1.00			1.86				
Incremental Delay, d2		0.1			74.2			0.8				
Delay (s)		1.8			85.7			23.4				
Level of Service		A			F			C				
Approach Delay (s)		1.8			85.7			23.4			0.0	
Approach LOS		A			F			C			A	

Intersection Summary				
HCM Average Control Delay	49.5	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	66.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	64	11	567	632	1458	495	178	235	137	112	684	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.91	0.85	1.00	1.00	0.95	1.00	0.97			1.00	0.93
Flpb, ped/bikes		1.00	1.00	0.90	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.91	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.98	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1448	1280	1597	3539	1319	1610	2913			3495	1291
Flt Permitted		0.25	1.00	0.60	1.00	1.00	0.95	0.91			0.75	1.00
Satd. Flow (perm)		369	1280	1006	3539	1319	1610	2661			2628	1291
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	70	12	616	672	1551	527	187	247	144	122	743	436
RTOR Reduction (vph)	0	47	127	0	0	88	0	60	0	0	0	15
Lane Group Flow (vph)	0	150	396	672	1551	439	168	350	0	0	865	421
Confl. Peds. (#/hr)	27		106	106		27	42		58	58		42
Confl. Bikes (#/hr)			14			5			2			6
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		52.5	52.5	52.5	52.5	52.5	9.0	45.0			31.5	31.5
Effective Green, g (s)		52.5	52.5	52.5	52.5	52.5	9.0	45.0			31.5	31.5
Actuated g/C Ratio		0.50	0.50	0.50	0.50	0.50	0.08	0.42			0.30	0.30
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		183	634	498	1753	653	137	1151			781	384
v/s Ratio Prot					0.44		c0.10	0.03				
v/s Ratio Perm		0.40	0.31	c0.67		0.33		0.10			c0.33	0.33
v/c Ratio		0.82	0.62	1.35	0.88	0.67	1.23	0.30			1.11	1.10
Uniform Delay, d1		22.7	19.5	26.8	24.0	20.2	48.5	20.2			37.2	37.2
Progression Factor		1.00	1.00	1.00	1.00	1.00	0.53	0.18			1.00	1.00
Incremental Delay, d2		31.7	4.6	170.1	7.0	5.5	135.5	0.4			65.8	74.6
Delay (s)		54.4	24.1	196.9	31.0	25.7	161.2	4.1			103.1	111.9
Level of Service		D	C	F	C	C	F	A			F	F
Approach Delay (s)		32.4			70.5			49.7			106.0	
Approach LOS		C			E			D			F	

Intersection Summary				
HCM Average Control Delay	71.8	HCM Level of Service	E	
HCM Volume to Capacity ratio	1.26			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	119.1%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	416	443	349	0	0	0	0	223	487	524	1225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.97						1.00	0.96	1.00	1.00	
Flpb, ped/bikes		0.97						1.00	1.00	1.00	1.00	
Frt		0.96						1.00	0.85	1.00	1.00	
Flt Protected		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (prot)		4345						3539	1329	1610	3172	
Flt Permitted		0.98						1.00	1.00	0.95	1.00	
Satd. Flow (perm)		4345						3539	1329	1610	3172	
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	457	360	0	0	0	0	242	529	570	1332	0
RTOR Reduction (vph)	0	69	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1177	0	0	0	0	0	242	529	513	1389	0
Confl. Peds. (#/hr)	70		75						96	96		
Confl. Bikes (#/hr)			6						3			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.0						18.0	106.0	45.0	45.0	
Effective Green, g (s)		30.0						18.0	106.0	45.0	45.0	
Actuated g/C Ratio		0.28						0.17	1.00	0.42	0.42	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1230						601	1329	683	1347	
v/s Ratio Prot								0.07		0.32	c0.44	
v/s Ratio Perm		0.27							c0.40			
v/c Ratio		0.96						0.40	0.40	0.75	1.03	
Uniform Delay, d1		37.4						39.2	0.0	25.8	30.5	
Progression Factor		1.00						1.00	1.00	1.06	1.04	
Incremental Delay, d2		17.2						2.0	0.9	0.7	17.3	
Delay (s)		54.6						41.2	0.9	27.9	48.9	
Level of Service		D						D	A	C	D	
Approach Delay (s)		54.6			0.0			13.5			43.2	
Approach LOS		D			A			B			D	

Intersection Summary				
HCM Average Control Delay	41.0	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	85.2%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	0	92	443	1102	165	637	258	0	0	384	704
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			4.5	4.5	4.5	4.0			4.0	
Lane Util. Factor		0.95			1.00	0.95	1.00	0.97	1.00		0.95	
Frpb, ped/bikes		1.00			1.00	1.00	0.96	1.00	1.00		0.87	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		1.00			1.00	1.00	0.85	1.00	1.00		0.90	
Flt Protected		0.95			0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)		1681			1770	3539	1329	3433	1863		2613	
Flt Permitted		0.95			0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)		1681			1770	3539	1329	3433	1863		2613	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	0.94	0.94	0.94
Adj. Flow (vph)	108	0	100	461	1148	172	692	280	0	0	409	749
RTOR Reduction (vph)	0	95	0	0	0	66	0	0	0	0	65	0
Lane Group Flow (vph)	97	16	0	461	1148	106	692	280	0	0	1093	0
Confl. Peds. (#/hr)	13		10	10		13	125					125
Confl. Bikes (#/hr)			16			6						13
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	5.0		32.5	32.5	32.5	19.0	61.0			38.0	
Effective Green, g (s)	5.0	5.0		32.5	32.5	32.5	19.0	61.0			38.0	
Actuated g/C Ratio	0.05	0.05		0.30	0.30	0.30	0.17	0.55			0.35	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	76	53		523	1046	393	593	1033			903	
v/s Ratio Prot	c0.06	0.01		0.26	c0.32		c0.20	0.15			c0.42	
v/s Ratio Perm						0.08						
v/c Ratio	1.28	0.29		0.88	1.10	0.27	1.17	0.27			1.53dr	
Uniform Delay, d1	52.5	50.8		36.9	38.8	29.7	45.5	12.8			36.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	194.3	1.1		18.9	58.4	1.7	92.4	0.1			104.8	
Delay (s)	246.8	51.9		55.8	97.2	31.4	137.9	12.9			140.8	
Level of Service	F	D		E	F	C	F	B			F	
Approach Delay (s)		142.8			80.1			101.9			140.8	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM Average Control Delay	105.5	HCM Level of Service	F	
HCM Volume to Capacity ratio	1.17			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.5	
Intersection Capacity Utilization	108.1%	ICU Level of Service	G	
Analysis Period (min)	15			
dr Defacto Right Lane. Recode with 1 though lane as a right lane.				
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	709	360	0	0	0	0	605	203	739	316	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0						4.0		3.5	4.0	
Lane Util. Factor		1.00	0.91					0.95		0.91	0.91	
Frpb, ped/bikes		1.00	0.98					0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.95					0.96		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	0.97	
Satd. Flow (prot)		1763	4717					3151		1610	3301	
Flt Permitted		0.95	1.00					1.00		0.17	0.54	
Satd. Flow (perm)		1763	4717					3151		282	1847	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	771	391	0	0	0	0	658	221	803	343	0
RTOR Reduction (vph)	0	86	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	348	1076	0	0	0	0	0	853	0	401	745	0
Confl. Peds. (#/hr)	3		46						21	21		
Confl. Bikes (#/hr)			2						7			
Parking (#/hr)					0			5				
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	29.0	29.0						37.0		68.5	68.5	
Effective Green, g (s)	29.0	29.0						37.0		68.5	68.5	
Actuated g/C Ratio	0.27	0.27						0.35		0.65	0.65	
Clearance Time (s)	5.0	5.0						4.0		3.5	4.0	
Lane Grp Cap (vph)	482	1291						1100		527	1571	
v/s Ratio Prot		c0.23						0.27		c0.20	0.12	
v/s Ratio Perm	0.20									c0.29	0.18	
v/c Ratio	0.72	0.83						0.78		0.76	0.47	
Uniform Delay, d1	34.9	36.2						30.8		25.2	9.6	
Progression Factor	0.81	0.79						1.00		1.00	1.00	
Incremental Delay, d2	6.4	4.6						5.4		9.9	1.0	
Delay (s)	34.5	33.3						36.2		35.1	10.6	
Level of Service	C	C						D		D	B	
Approach Delay (s)		33.6			0.0			36.2			19.2	
Approach LOS		C			A			D			B	

Intersection Summary				
HCM Average Control Delay	29.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	78.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
1: Santa Clara Av & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	11	293	728	605	604	221	393	197	154	680	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Util. Factor		0.95	0.95	1.00	0.95	1.00	0.91	0.91			0.95	1.00
Frpb, ped/bikes		0.99	0.96	1.00	1.00	0.93	1.00	0.97			1.00	0.94
Flpb, ped/bikes		0.99	1.00	0.98	1.00	1.00	1.00	1.00			0.99	1.00
Frt		0.97	0.85	1.00	1.00	0.85	1.00	0.95			1.00	0.85
Flt Protected		0.97	1.00	0.95	1.00	1.00	0.95	1.00			0.99	1.00
Satd. Flow (prot)		1620	1445	1735	3539	1291	1610	2932			3487	1297
Flt Permitted		0.46	1.00	0.66	1.00	1.00	0.95	0.88			0.70	1.00
Satd. Flow (perm)		771	1445	1198	3539	1291	1610	2589			2459	1297
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	12	318	791	658	657	238	423	212	166	731	344
RTOR Reduction (vph)	0	11	133	0	0	134	0	57	0	0	0	67
Lane Group Flow (vph)	0	135	153	791	658	523	214	602	0	0	897	277
Confl. Peds. (#/hr)	45		22	22		45	47		72	72		47
Confl. Bikes (#/hr)			9			18			3			4
Parking (#/hr)						5		5				5
Turn Type	Perm		Perm	Perm		Perm	Prot			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8				6		6
Actuated Green, G (s)		39.5	39.5	39.5	39.5	39.5	7.0	41.5			30.5	30.5
Effective Green, g (s)		39.5	39.5	39.5	39.5	39.5	7.0	41.5			30.5	30.5
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.08	0.46			0.34	0.34
Clearance Time (s)		4.5	4.5	4.5	4.5	4.5	4.0	4.5			4.5	4.5
Lane Grp Cap (vph)		338	634	526	1553	567	125	1220			833	440
v/s Ratio Prot					0.19		c0.13	0.04				
v/s Ratio Perm		0.17	0.11	c0.66		0.41		0.19			c0.36	0.21
v/c Ratio		0.40	0.24	1.50	0.42	0.92	1.71	1.12dr			1.08	0.63
Uniform Delay, d1		17.2	15.8	25.2	17.4	23.8	41.5	16.9			29.8	25.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.12	1.48			1.00	1.00
Incremental Delay, d2		3.5	0.9	236.5	0.8	22.9	344.4	1.1			54.0	6.7
Delay (s)		20.7	16.7	261.8	18.3	46.8	391.1	26.0			83.7	31.7
Level of Service		C	B	F	B	D	F	C			F	C
Approach Delay (s)		18.1			118.6			115.5			69.3	
Approach LOS		B			F			F			E	

Intersection Summary				
HCM Average Control Delay	95.5	HCM Level of Service		F
HCM Volume to Capacity ratio	1.35			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		13.0
Intersection Capacity Utilization	120.3%	ICU Level of Service		H
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
2: MacArthur Blvd & Grand Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	1108	346	0	0	0	0	389	1347	922	784	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5	4.0	4.0	4.0	
Lane Util. Factor		0.91						0.95	1.00	0.91	0.91	
Frpb, ped/bikes		0.98						1.00	0.94	1.00	1.00	
Flpb, ped/bikes		1.00						1.00	1.00	1.00	1.00	
Frt		0.97						1.00	0.85	1.00	1.00	
Flt Protected		0.99						1.00	1.00	0.95	0.98	
Satd. Flow (prot)		4606						3539	1296	1610	3128	
Flt Permitted		0.99						1.00	1.00	0.95	0.98	
Satd. Flow (perm)		4606						3539	1266	1610	3128	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	296	1204	376	0	0	0	0	409	1418	1002	852	0
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1828	0	0	0	0	0	409	1418	1002	1253	0
Confl. Peds. (#/hr)	1		83						162	162		
Confl. Bikes (#/hr)			5						23			
Parking (#/hr)		5							5		5	
Turn Type	Perm								Free	Split		
Protected Phases		4						2		1	1	
Permitted Phases	4								Free			
Actuated Green, G (s)		30.5						18.5	90.0	28.0	28.0	
Effective Green, g (s)		30.5						18.6	90.0	28.0	28.0	
Actuated g/C Ratio		0.34						0.21	1.00	0.31	0.31	
Clearance Time (s)		4.5						4.5		4.0	4.0	
Lane Grp Cap (vph)		1561						727	1266	501	973	
v/s Ratio Prot								0.12		0.37	c0.40	
v/s Ratio Perm		0.40							c1.09			
v/c Ratio		1.17						0.56	1.09	1.20	1.29	
Uniform Delay, d1		29.8						32.1	45.0	31.0	31.0	
Progression Factor		1.00						1.00	1.00	0.87	0.88	
Incremental Delay, d2		84.1						3.1	54.8	91.7	130.2	
Delay (s)		113.9						35.2	99.8	118.8	157.4	
Level of Service		F						D	F	F	F	
Approach Delay (s)		113.9			0.0			85.4			144.9	
Approach LOS		F			A			F			F	

Intersection Summary				
HCM Average Control Delay	114.9	HCM Level of Service		F
HCM Volume to Capacity ratio	1.16			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		4.0
Intersection Capacity Utilization	93.1%	ICU Level of Service		F
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	0	368	243	1230	270	405	441	0	0	180	292
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95		1.00	0.95	1.00	0.97	1.00			0.95	
Frpb, ped/bikes	1.00	0.75		1.00	1.00	0.92	1.00	1.00			0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.85		1.00	1.00	0.85	1.00	1.00			0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	990		1770	3539	1269	3433	1863			2488	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	990		1770	3539	1269	3433	1863			2488	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	0	400	261	1323	290	440	479	0	0	196	317
RTOR Reduction (vph)	0	350	0	0	0	111	0	0	0	0	139	0
Lane Group Flow (vph)	35	54	0	261	1323	179	440	479	0	0	374	0
Confl. Peds. (#/hr)	47		70	70		47	232					232
Confl. Bikes (#/hr)			16			7						22
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	8.0		33.1	33.1	33.1	11.0	31.3			16.3	
Effective Green, g (s)	8.0	8.0		33.1	33.1	33.1	11.0	31.3			16.3	
Actuated g/C Ratio	0.10	0.10		0.39	0.39	0.39	0.13	0.37			0.19	
Clearance Time (s)	3.0	3.0		4.5	4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	160	94		698	1396	501	450	695			483	
v/s Ratio Prot	0.02	c0.05		0.15	c0.37		c0.13	0.26			c0.15	
v/s Ratio Perm						0.14						
v/c Ratio	0.22	0.57		0.37	0.95	0.36	0.98	0.69			0.87dr	
Uniform Delay, d1	35.1	36.3		18.0	24.6	17.9	36.3	22.2			32.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.3	5.2		1.5	14.5	2.0	36.1	2.3			6.9	
Delay (s)	35.3	41.5		19.6	39.0	19.9	72.4	24.5			39.0	
Level of Service	D	D		B	D	B	E	C			D	
Approach Delay (s)		41.0			33.4			47.4			39.0	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	38.5	HCM Level of Service		D
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	83.9	Sum of lost time (s)		15.5
Intersection Capacity Utilization	95.6%	ICU Level of Service		F
Analysis Period (min)	15			

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Measure DD
6: MacArthur Blvd & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	448	2294	588	0	0	0	0	393	530	575	157	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Util. Factor	1.00	0.91						0.95		0.91	0.91	
Frpb, ped/bikes	1.00	0.99						0.93		1.00	1.00	
Flpb, ped/bikes	0.93	1.00						1.00		1.00	1.00	
Frt	1.00	0.97						0.91		1.00	1.00	
Flt Protected	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (prot)	1641	4682						2819		1610	3284	
Flt Permitted	0.95	1.00						1.00		0.95	0.97	
Satd. Flow (perm)	1641	4682						2819		1610	3284	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	477	2440	626	0	0	0	0	414	558	625	171	0
RTOR Reduction (vph)	0	51	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	477	3015	0	0	0	0	0	971	0	312	484	0
Confl. Peds. (#/hr)	70		33						70	70		
Confl. Bikes (#/hr)			4						12			
Parking (#/hr)					0			5				
Turn Type	Perm									Split		
Protected Phases		4						2		1	1	
Permitted Phases	4											
Actuated Green, G (s)	40.0	40.0						26.0		11.5	11.5	
Effective Green, g (s)	40.0	40.0						26.0		11.5	11.5	
Actuated g/C Ratio	0.44	0.44						0.29		0.13	0.13	
Clearance Time (s)	5.0	5.0						4.0		3.5	3.5	
Lane Grp Cap (vph)	729	2170						814		206	420	
v/s Ratio Prot		c0.62						c0.34		c0.19	0.15	
v/s Ratio Perm	0.29											
v/c Ratio	0.65	1.39						1.47dr		1.51	1.46dl	
Uniform Delay, d1	19.6	25.0						32.0		39.2	39.2	
Progression Factor	0.63	0.66						1.00		1.00	1.00	
Incremental Delay, d2	0.4	175.6						99.0		254.9	92.6	
Delay (s)	12.7	192.0						131.0		294.2	131.8	
Level of Service	B	F						F		F	F	
Approach Delay (s)		167.8			0.0			131.0			195.5	
Approach LOS		F			A			F			F	

Intersection Summary				
HCM Average Control Delay	165.2	HCM Level of Service		F
HCM Volume to Capacity ratio	1.34			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		12.5
Intersection Capacity Utilization	115.5%	ICU Level of Service		H
Analysis Period (min)	15			

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Saturday Peak Analysis

HCM Signalized Intersection Capacity Analysis — Existing- Saturday Peak
5: Lake Park Av & Lakeshore Av — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	0	90	345	491	140	127	433	0	0	311	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.98			1.00	0.83	1.00	1.00			0.85	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1296			3468	1145	1770	3539			2633	
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1296			3468	1145	1770	3539			2633	
Peak-hour factor, PHF	0.73	0.73	0.73	0.92	0.92	0.92	0.97	0.97	0.97	0.93	0.93	0.93
Adj. Flow (vph)	84	0	123	375	534	152	131	446	0	0	334	260
RTOR Reduction (vph)	0	117	0	0	0	90	0	0	0	0	167	0
Lane Group Flow (vph)	76	14	0	0	909	62	131	446	0	0	427	0
Confl. Peds. (#/hr)	187		2	2		187	513					513
Confl. Bikes (#/hr)						4						16
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.1	3.1			25.8	25.8	7.7	26.6			14.9	
Effective Green, g (s)	3.1	3.1			25.8	25.8	7.7	26.6			14.9	
Actuated g/C Ratio	0.05	0.05			0.39	0.39	0.11	0.40			0.22	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	78	60			1335	441	203	1405			586	
v/s Ratio Prot	c0.05	0.01			c0.26		c0.07	0.13			c0.16	
v/s Ratio Perm						0.05						
v/c Ratio	0.97	0.23			0.68	0.14	0.65	0.32			0.73	
Uniform Delay, d1	31.9	30.8			17.2	13.4	28.3	13.9			24.2	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	92.2	0.7			2.8	0.7	5.2	0.0			3.8	
Delay (s)	124.1	31.5			20.0	14.1	33.5	14.0			28.0	
Level of Service	F	C			B	B	C	B			C	
Approach Delay (s)		65.5			19.1			18.4			28.0	
Approach LOS		E			B			B			C	

Intersection Summary				
HCM Average Control Delay	25.1	HCM Level of Service		C
HCM Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	67.0	Sum of lost time (s)		15.5
Intersection Capacity Utilization	70.3%	ICU Level of Service		C
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	0	84	179	732	196	127	356	0	0	248	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.98			1.00	0.76	1.00	1.00			0.80	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.91	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1296			3505	1055	1770	3539			2413	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1296			3505	1055	1770	3539			2413	
Peak-hour factor, PHF	0.73	0.73	0.73	0.92	0.92	0.92	0.97	0.97	0.97	0.93	0.93	0.93
Adj. Flow (vph)	84	0	115	195	796	213	131	367	0	0	267	376
RTOR Reduction (vph)	0	110	0	0	0	118	0	0	0	0	155	0
Lane Group Flow (vph)	76	13	0	0	991	95	131	367	0	0	489	0
Confl. Peds. (#/hr)	187		2	2		187	513					513
Confl. Bikes (#/hr)						4						16
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.1	3.1			25.8	25.8	7.8	29.2			17.4	
Effective Green, g (s)	3.1	3.1			25.8	25.8	7.8	29.2			17.4	
Actuated g/C Ratio	0.04	0.04			0.37	0.37	0.11	0.42			0.25	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	75	58			1299	391	198	1485			603	
v/s Ratio Prot	c0.05	0.01			c0.28		c0.07	0.10			c0.20	
v/s Ratio Perm						0.09						
v/c Ratio	1.01	0.23			0.76	0.24	0.66	0.25			0.81	
Uniform Delay, d1	33.2	32.1			19.2	15.2	29.6	13.1			24.5	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	107.7	0.7			4.3	1.5	6.3	0.0			7.7	
Delay (s)	140.9	32.8			23.5	16.6	35.9	13.1			32.2	
Level of Service	F	C			C	B	D	B			C	
Approach Delay (s)		74.1			22.3			19.1			32.2	
Approach LOS		E			C			B			C	

Intersection Summary				
HCM Average Control Delay	28.2	HCM Level of Service		C
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	69.6	Sum of lost time (s)		15.5
Intersection Capacity Utilization	73.3%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis
5: Lake Park Av & Lakeshore Av — Measure DD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	0	96	378	672	160	154	474	0	0	340	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.98			1.00	0.81	1.00	1.00			0.84	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.93	
Flt Protected	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1299			3477	1125	1770	3539			2576	
Flt Permitted	0.95	1.00			0.98	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1299			3477	1125	1770	3539			2576	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.93	0.93	0.93
Adj. Flow (vph)	95	0	104	411	730	174	159	489	0	0	366	324
RTOR Reduction (vph)	0	100	0	0	0	87	0	0	0	0	135	0
Lane Group Flow (vph)	85	14	0	0	1141	87	159	489	0	0	555	0
Confl. Peds. (#/hr)	187		2	2		187	513					513
Confl. Bikes (#/hr)						4						16
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	3.0			25.3	25.3	10.3	33.1			18.8	
Effective Green, g (s)	3.0	3.0			25.3	25.3	10.3	33.1			18.8	
Actuated g/C Ratio	0.04	0.04			0.35	0.35	0.14	0.45			0.26	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	69	53			1207	390	250	1607			664	
v/s Ratio Prot	c0.05	0.01			c0.33		c0.09	0.14			c0.22	
v/s Ratio Perm						0.08						
v/c Ratio	1.23	0.27			0.95	0.22	0.64	0.30			0.84	
Uniform Delay, d1	35.0	33.9			23.1	16.8	29.5	12.6			25.6	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	183.3	1.0			15.7	1.3	3.9	0.0			8.6	
Delay (s)	218.2	34.9			38.9	18.2	33.4	12.6			34.2	
Level of Service	F	C			D	B	C	B			C	
Approach Delay (s)		113.2			36.1			17.7			34.2	
Approach LOS		F			D			B			C	

Intersection Summary				
HCM Average Control Delay	36.8	HCM Level of Service		D
HCM Volume to Capacity ratio	0.87			
Actuated Cycle Length (s)	72.9	Sum of lost time (s)		15.5
Intersection Capacity Utilization	81.6%	ICU Level of Service		D
Analysis Period (min)	15			
c Critical Lane Group				

HCM Signalized Intersection Capacity Analysis — Measure DD
5: Lake Park Av & Lakeshore Av — 5/23/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	0	168	254	935	196	137	425	0	0	331	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	0.98			1.00	0.75	1.00	1.00			0.82	
Flpb, ped/bikes	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.86			1.00	0.85	1.00	1.00			0.92	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)	1681	1292			3502	1040	1770	3539			2500	
Flt Permitted	0.95	1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (perm)	1681	1292			3502	1040	1770	3539			2500	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.93	0.93	0.93
Adj. Flow (vph)	95	0	183	276	1016	213	141	438	0	0	356	387
RTOR Reduction (vph)	0	175	0	0	0	94	0	0	0	0	140	0
Lane Group Flow (vph)	85	18	0	0	1292	119	141	438	0	0	603	0
Confl. Peds. (#/hr)	187		2	2		187	513					513
Confl. Bikes (#/hr)						4						16
Parking (#/hr)		5				5					5	
Turn Type	Split			Split		Perm	Prot					
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8						
Actuated Green, G (s)	3.1	3.1			25.6	25.6	8.3	32.8			20.5	
Effective Green, g (s)	3.1	3.1			25.6	25.6	8.3	32.8			20.5	
Actuated g/C Ratio	0.04	0.04			0.35	0.35	0.11	0.45			0.28	
Clearance Time (s)	3.0	3.0			4.5	4.5	4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)	71	55			1228	365	201	1590			702	
v/s Ratio Prot	c0.05	0.01			c0.37		c0.08	0.12			c0.24	
v/s Ratio Perm						0.11						
v/c Ratio	1.20	0.32			1.05	0.33	0.70	0.28			0.86	
Uniform Delay, d1	35.0	33.9			23.7	17.4	31.2	12.6			24.9	
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	169.4	1.2			40.6	2.4	8.7	0.0			9.9	
Delay (s)	204.3	35.2			64.3	19.8	39.9	12.7			34.8	
Level of Service	F	D			E	B	D	B			C	
Approach Delay (s)		86.9			58.0			19.3			34.8	
Approach LOS		F			E			B			C	

Intersection Summary				
HCM Average Control Delay	47.8	HCM Level of Service		D
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	73.0	Sum of lost time (s)		15.5
Intersection Capacity Utilization	88.6%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

Arterial Analysis

Arterial Level of Service — Existing- AM Peak
Measure DD

Arterial Level of Service: NB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	7.3	24.6	0.08	11.5	D
International Blvd	IV	25	27.6	16.8	44.4	0.15	12.4	D
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		60.8	24.1	84.9	0.29	12.4	D

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	20.5	60.9	0.26	15.6	C
International Blvd	IV	25	19.5	16.4	35.9	0.07	7.4	E
Oak St	IV	25	42.2	11.6	53.8	0.28	18.5	C
Madison St	IV	25	17.9	2.3	20.2	0.07	12	D
Total	2 IV		120	50.8	170.8	0.68	14.4	C

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	24.2	42.4	0.08	7	E
21st St	IV	25	19.1	7.8	26.9	0.07	9.6	D
Grand Av #3	IV	25	24.6	5.6	30.2	0.11	13.3	C
Total	3 IV		61.9	37.6	99.5	0.27	9.6	D

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	24.5	46.2	0.1	7.7	E
21st St	IV	25	24.6	9.9	34.5	0.11	11.7	D
Driveway	IV	25	18.5	34.4	52.9	0.07	4.8	F
Total	4 IV		64.8	68.8	133.6	0.28	7.5	E

Arterial Level of Service — Existing- PM Peak
Measure DD

Arterial Level of Service: NB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	12.2	29.5	0.08	9.6	D
International Blvd	IV	25	27.6	41.9	69.5	0.15	7.9	E
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		60.8	54.1	114.9	0.29	9.2	D

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	16.9	57.3	0.26	16.6	C
International Blvd	IV	25	19.5	15.5	35	0.07	7.6	E
Oak St	IV	25	42.2	9.5	51.7	0.28	19.2	B
Madison St	IV	25	17.9	2.1	20	0.07	12.1	D
Total	2 IV		120	44	164	0.68	14.9	C

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	29.4	47.6	0.08	6.3	F
21st St	IV	25	19.1	9.9	29	0.07	8.9	E
Grand Av #3	IV	25	24.6	31.4	56	0.11	7.2	E
Total	3 IV		61.9	70.7	132.6	0.27	7.2	E

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	27.9	49.6	0.1	7.1	E
21st St	IV	25	24.6	9.2	33.8	0.11	11.9	D
Driveway	IV	25	18.5	34.2	52.7	0.07	4.8	F
Total	4 IV		64.8	71.3	136.1	0.28	7.4	E

Arterial Level of Service — Existing+Variants A & B- AM Peak
Measure DD

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	7.3	24.6	0.08	11.5	D
12th St #2	IV	25	26.2	0	26.2	0.15	20	B
12th St #1#2	IV	25	12	5.4	17.4	0.05	9.4	D
Convention Ctr	IV	25	23.8	0.8	24.6	0.11	15.8	C
E. 12TH	IV	25	27.5	1.2	28.7	0.12	15.7	C
International Blvd	IV	25	17.9	2.2	20.1	0.07	12.1	D
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		140.6	16.9	157.5	0.29	6.6	F

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	29.3	69.7	0.26	13.6	C
Lakeshore	IV	25	12.6	1.7	14.3	0.05	12	D
E 15th St	IV	25	5.8	5.7	11.5	0.02	6.9	F
International Blvd	IV	25	19.5	13.5	33	0.07	8	E
Driveway	IV	25	17.9	16.1	34	0.07	7.2	E
Convention Ctr	IV	25	27.5	2.5	30	0.12	15	C
11th-12th St #1#2	IV	25	23.8	8.7	32.5	0.11	12	D
12th St #2	IV	25	12	0.2	12.2	0.05	13.4	C
Oak St	IV	25	17.9	16.3	34.2	0.07	7.1	E
Madison St	IV	25	17.9	2.4	20.3	0.07	12	D
Total	2 IV		195.3	96.4	291.7	0.68	8.4	E

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	27.4	45.6	0.08	6.5	F
Lakeside Dr	IV	25	13.1	25.1	38.2	0.05	4.7	F
21st St	IV	25	19.8	10.9	30.7	0.09	10.5	D
Grand Av #3	IV	25	24.6	5.6	30.2	0.11	13.3	C
Total	3 IV		75.7	69	144.7	0.27	6.7	F

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	24.5	46.2	0.1	7.7	E
21st St	IV	25	24.6	11.8	36.4	0.11	11.1	D
Lakeside Dr	IV	25	19.8	10.7	30.5	0.09	10.6	D
Driveway	IV	25	13.1	4	17.1	0.05	10.4	D
Total	4 IV		79.2	51	130.2	0.28	7.7	E

Arterial Level of Service — Existing+Variants A & B- PM Peak
Measure DD

Arterial Level of Service: EB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	12.2	29.5	0.08	9.6	D
12th St #2	IV	25	26.2	0.1	26.3	0.15	19.9	B
12th St #1#2	IV	25	12	18.5	30.5	0.05	5.4	F
Convention Ctr	IV	25	23.8	3.8	27.6	0.11	14.1	C
E. 12TH	IV	25	27.5	13.8	41.3	0.12	10.9	D
International Blvd	IV	25	17.9	10	27.9	0.07	8.7	E
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		140.6	58.4	199	0.29	5.2	F

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	13.6	54	0.26	17.6	C
Lakeshore	IV	25	12.6	2.3	14.9	0.05	11.5	D
E 15th St	IV	25	5.8	8.5	14.3	0.02	5.5	F
International Blvd	IV	25	19.5	7.5	27	0.07	9.8	D
Driveway	IV	25	17.9	8.9	26.8	0.07	9.1	D
Convention Ctr	IV	25	27.5	2.7	30.2	0.12	14.9	C
11th-12th St #1#2	IV	25	23.8	13.8	37.6	0.11	10.3	D
12th St #2	IV	25	12	0.1	12.1	0.05	13.5	C
Oak St	IV	25	17.9	10.6	28.5	0.07	8.5	E
Madison St	IV	25	17.9	2.1	20	0.07	12.1	D
Total	2 IV		195.3	70.1	265.4	0.68	9.2	D

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	18.1	36.3	0.08	8.2	E
Lakeside Dr	IV	25	13.1	26.6	39.7	0.05	4.5	F
21st St	IV	25	19.8	12.6	32.4	0.09	10	D
Grand Av #3	IV	25	24.6	31.4	56	0.11	7.2	E
Total	3 IV		75.7	88.7	164.4	0.27	5.9	F

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	27.9	49.6	0.1	7.1	E
21st St	IV	25	24.6	9.9	34.5	0.11	11.7	D
Lakeside Dr	IV	25	19.8	5.5	25.3	0.09	12.8	D
Driveway	IV	25	13.1	11.5	24.6	0.05	7.2	E
Total	4 IV		79.2	54.8	134	0.28	7.5	E

Arterial Level of Service — Cumulative(2025) No Proj- AM Peak
Measure DD

Arterial Level of Service: NB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	9.7	27	0.08	10.5	D
International Blvd	IV	25	27.6	17.4	45	0.15	12.3	D
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		60.8	27.1	87.9	0.29	12	D

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	16.5	56.9	0.26	16.7	C
International Blvd	IV	25	19.5	15.9	35.4	0.07	7.5	E
Oak St	IV	25	42.2	20.1	62.3	0.28	15.9	C
Madison St	IV	25	17.9	4.6	22.5	0.07	10.8	D
Total	2 IV		120	57.1	177.1	0.68	13.8	C

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	24.9	43.1	0.08	6.9	F
21st St	IV	25	19.1	10.1	29.2	0.07	8.9	E
Grand Av #3	IV	25	24.6	4	28.6	0.11	14.1	C
Total	3 IV		61.9	39	100.9	0.27	9.5	D

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	41.5	63.2	0.1	5.6	F
21st St	IV	25	24.6	13.3	37.9	0.11	10.6	D
Driveway	IV	25	18.5	38.6	57.1	0.07	4.4	F
Total	4 IV		64.8	93.4	158.2	0.28	6.4	F

Arterial Level of Service — Cumulative(2025) No Proj- PM Peak
Measure DD

Arterial Level of Service: NB #1

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St	IV	25	17.3	24.5	41.8	0.08	6.8	F
International Blvd	IV	25	27.6	118.8	146.4	0.15	3.8	F
E 15th St #1	IV	25	15.9	0	15.9	0.06	13.6	C
Total	1 IV		60.8	143.3	204.1	0.29	5.2	F

Arterial Level of Service: WB #2

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av	IV	25	40.4	20.6	61	0.26	15.6	C
International Blvd	IV	25	19.5	19.4	38.9	0.07	6.8	F
Oak St	IV	25	42.2	9.7	51.9	0.28	19.1	B
Madison St	IV	25	17.9	4.2	22.1	0.07	11	D
Total	2 IV		120	53.9	173.9	0.68	14.1	C

Arterial Level of Service: NB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	18.2	30.2	48.4	0.08	6.2	F
21st St	IV	25	19.1	12.4	31.5	0.07	8.2	E
Grand Av #3	IV	25	24.6	68.7	93.3	0.11	4.3	F
Total	3 IV		61.9	111.3	173.2	0.27	5.5	F

Arterial Level of Service: WB #3

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St	IV	25	21.7	30	51.7	0.1	6.9	F
21st St	IV	25	24.6	9.5	34.1	0.11	11.8	D
Driveway	IV	25	18.5	36.6	55.1	0.07	4.6	F
Total	4 IV		64.8	76.1	140.9	0.28	7.2	E

Arterial Level of Service — Cumu(2025)+Variants A & B- AM Peak
Measure DD

Arterial Level of Service: EB #1

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St		IV	25	17.3	9.4	26.7	0.08	10.6	D
12th St #2		IV	25	26.2	0	26.2	0.15	20	B
12th St #1#2		IV	25	12	6	18	0.05	9.1	D
Convention Ctr		IV	25	23.8	1	24.8	0.11	15.7	C
E. 12TH		IV	25	27.5	1.7	29.2	0.12	15.4	C
International Blvd		IV	25	17.9	2.5	20.4	0.07	11.9	D
E 15th St #1		IV	25	15.9	0	15.9	0.06	13.6	C
Total	1	IV		140.6	20.6	161.2	0.29	6.5	F

Arterial Level of Service: WB #2

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av		IV	25	40.4	39.3	79.7	0.26	11.9	D
Lakeshore		IV	25	12.6	2.8	15.4	0.05	11.2	D
E 15th St		IV	25	5.8	9.5	15.3	0.02	5.2	F
International Blvd		IV	25	19.5	17.6	37.1	0.07	7.1	E
Driveway		IV	25	17.9	25.8	43.7	0.07	5.6	F
Convention Ctr		IV	25	27.5	5.2	32.7	0.12	13.8	C
11th-12th St #1#2		IV	25	23.8	10.7	34.5	0.11	11.3	D
12th St #2		IV	25	12	0.3	12.3	0.05	13.3	C
Oak St		IV	25	17.9	54.9	72.8	0.07	3.3	F
Madison St		IV	25	17.9	3	20.9	0.07	11.6	D
Total	2	IV		195.3	169.1	364.4	0.68	6.7	F

Arterial Level of Service: NB #3

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St		IV	25	18.2	28	46.2	0.08	6.5	F
Lakeside Dr		IV	25	13.1	39.6	52.7	0.05	3.4	F
21st St		IV	25	19.8	10.2	30	0.09	10.8	D
Grand Av #3		IV	25	24.6	4	28.6	0.11	14.1	C
Total	3	IV		75.7	81.8	157.5	0.27	6.2	F

Arterial Level of Service: WB #3

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St		IV	25	21.7	41.4	63.1	0.1	5.6	F
21st St		IV	25	24.6	20.5	45.1	0.11	8.9	E
Lakeside Dr		IV	25	19.8	12.4	32.2	0.09	10.1	D
Driveway		IV	25	13.1	11.2	24.3	0.05	7.3	E
Total	4	IV		79.2	85.5	164.7	0.28	6.1	F

Arterial Level of Service — Cumu(2025)+Variants A & B- PM Peak
Measure DD

Arterial Level of Service: EB #1

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Madison St		IV	25	17.3	17.9	35.2	0.08	8.1	E
12th St #2		IV	25	26.2	0.1	26.3	0.15	19.9	B
12th St #1#2		IV	25	12	72.2	84.2	0.05	1.9	F
Convention Ctr		IV	25	23.8	7.4	31.2	0.11	12.5	D
E. 12TH		IV	25	27.5	18.8	46.3	0.12	9.7	D
International Blvd		IV	25	17.9	13	30.9	0.07	7.9	E
E 15th St #1		IV	25	15.9	0	15.9	0.06	13.6	C
Total	1	IV		140.6	129.4	270	0.29	3.9	F

Arterial Level of Service: WB #2

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Lakeshore Av		IV	25	40.4	17.9	58.3	0.26	16.3	C
Lakeshore		IV	25	12.6	3.6	16.2	0.05	10.6	D
E 15th St		IV	25	5.8	8	13.8	0.02	5.7	F
International Blvd		IV	25	19.5	8.1	27.6	0.07	9.6	D
Driveway		IV	25	17.9	6.7	24.6	0.07	9.9	D
Convention Ctr		IV	25	27.5	2.7	30.2	0.12	14.9	C
11th-12th St #1#2		IV	25	23.8	15.7	39.5	0.11	9.8	D
12th St #2		IV	25	12	0.1	12.1	0.05	13.5	C
Oak St		IV	25	17.9	10.9	28.8	0.07	8.4	E
Madison St		IV	25	17.9	4.1	22	0.07	11	D
Total	2	IV		195.3	77.8	273.1	0.68	9.0	E

Arterial Level of Service: NB #3

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St		IV	25	18.2	23.7	41.9	0.08	7.1	E
Lakeside Dr		IV	25	13.1	28.4	41.5	0.05	4.3	F
21st St		IV	25	19.8	22.1	41.9	0.09	7.7	E
Grand Av #3		IV	25	24.6	68.7	93.3	0.11	4.3	F
Total	3	IV		75.7	142.9	218.6	0.27	4.4	F

Arterial Level of Service: WB #3

Cross Street		Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Harrison St		IV	25	21.7	30	51.7	0.1	6.9	F
21st St		IV	25	24.6	10.2	34.8	0.11	11.6	D
Lakeside Dr		IV	25	19.8	6.1	25.9	0.09	12.5	D
Driveway		IV	25	13.1	14.6	27.7	0.05	6.4	F
Total	4	IV		79.2	60.9	140.1	0.28	7.2	E

APPENDIX F

AIR QUALITY DATA

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	7	-150	7	0	* AG	649	7.9	.0	10.0
B. Grand Av NBD	*	7	0	7	150	* AG	765	5.4	.0	10.0
C. Grand Av NBL	*	5	-150	0	0	* AG	256	11.4	.0	10.0
D. Grand Av SBA	*	-5	150	-5	0	* AG	881	8.1	.0	11.8
E. Grand Av SBD	*	-5	0	-5	-150	* AG	1304	5.7	.0	10.0
F. Grand Av SBL	*	-2	150	0	0	* AG	51	10.5	.0	10.0
G. Santa Cl EBA	*	-150	-4	0	-4	* AG	278	10.0	.0	10.0
H. Santa Cl EBD	*	0	-4	150	-4	* AG	241	6.1	.0	10.0
I. Santa Cl EBL	*	-150	-2	0	0	* AG	86	10.5	.0	10.0
J. Santa Cl WBA	*	150	9	0	9	* AG	765	10.8	.0	13.5
K. Santa Cl WBD	*	0	9	-150	9	* AG	1129	10.5	.0	10.0
L. Santa Cl WBL	*	150	5	0	0	* AG	473	11.6	.0	10.0
M. Grand A NBAX	*	7	-750	7	-150	* AG	905	5.1	.0	10.0
N. Grand A NBDX	*	7	150	7	750	* AG	765	5.1	.0	10.0
O. Grand A SBAX	*	-5	750	-5	150	* AG	932	5.1	.0	11.8
P. Grand A SBDX	*	-5	-150	-5	-750	* AG	1304	5.1	.0	10.0
Q. Santa C EBAX	*	-750	-4	-150	-4	* AG	364	5.1	.0	10.0
R. Santa C EBDX	*	150	-4	750	-4	* AG	241	5.1	.0	10.0
S. Santa C WBAX	*	750	9	150	9	* AG	1238	5.1	.0	13.5

T. Santa C WBDX	*	-150	9	-750	9	* AG	1129	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-13	15	1.8
3. SW	*	-12	-10	1.8
4. NE	*	14	17	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	15	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	17	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-13	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	15	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	17	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-13	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	280.	* 2.0	*	.3	.0	.1	.0	.3	.0	.4	.0
2. NW	*	171.	* 2.6	*	.2	.0	.2	.2	.8	.0	.1	.0
3. SW	*	79.	* 2.3	*	.2	.0	.1	.0	.5	.0	.0	.2
4. NE	*	261.	* 2.3	*	.0	.3	.0	.3	.0	.0	.1	.0
5. ES mdblk	*	278.	* 1.6	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	98.	* 2.4	*	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	82.	* 1.6	*	.0	.0	.0	.0	.0	.0	.4	.0
8. EN mdblk	*	262.	* 2.1	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	* 1.9	*	.7	.0	.3	.2	.3	.0	.0	.0
10. NW mdblk	*	173.	* 1.9	*	.1	.1	.0	.9	.1	.0	.0	.0
11. SW mdblk	*	8.	* 1.9	*	.2	.0	.2	.0	1.0	.0	.0	.0
12. NE mdblk	*	187.	* 1.6	*	.0	.6	.0	.3	.2	.0	.0	.0
13. ES blk	*	276.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 1.6	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.1	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. NW	*	.0	.0	.8	.0	.1	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.5	.0	.6	.0	.0	.0	.0	.0	.0	.1	.0
4. NE	*	.0	.2	1.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.4	.3	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.1	1.6	.1	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.1	.2	.5	.1	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	1.1	.2	.4	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.4	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.9
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.4
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.9	.0
17. SE blk	*	.0	.0	.0	.0	.7	.0	.0	.4	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.3	.7	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.3	.0	.0	1.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.6	.3	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	5	-150	5	0	* AG	1045	8.4	.0	13.5
B. Grand Av NBD	*	5	0	5	150	* AG	749	5.4	.0	10.0
C. Grand Av NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Grand Av SBA	*	-7	150	-7	0	* AG	794	7.9	.0	10.0
E. Grand Av SBD	*	-7	0	-7	-150	* AG	1133	5.6	.0	10.0
F. Grand Av SBL	*	-5	150	0	0	* AG	425	11.6	.0	10.0
G. MacArthu EBA	*	-150	-4	0	-4	* AG	892	10.0	.0	11.8
H. MacArthu EBD	*	0	-4	150	-4	* AG	1546	10.5	.0	10.0
I. MacArthu EBL	*	-150	-2	0	0	* AG	272	11.4	.0	10.0
J. MacArthu WBA	*	150	0	0	0	* AG	0	5.1	.0	10.0
K. MacArthu WBD	*	0	0	-150	0	* AG	0	5.1	.0	10.0
L. MacArthu WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Grand A NBAX	*	5	-750	5	-150	* AG	1045	5.1	.0	13.5
N. Grand A NBDX	*	5	150	5	750	* AG	749	5.1	.0	10.0
O. Grand A SBAX	*	-7	750	-7	150	* AG	1219	5.1	.0	10.0
P. Grand A SBDX	*	-7	-150	-7	-750	* AG	1133	5.1	.0	10.0
Q. MacArth EBAX	*	-750	-4	-150	-4	* AG	1164	5.1	.0	11.8
R. MacArth EBDX	*	150	-4	750	-4	* AG	1546	5.1	.0	10.0
S. MacArth WBAX	*	750	0	150	0	* AG	0	5.1	.0	10.0

T. MacArth WBDX	*	-150	0	-750	0	* AG	0	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-11	1.8
4. NE	*	12	7	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-11	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-11	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	279.	* 2.6	*	.5	.0	.0	.0	.2	.0	1.0	.5
2. NW	*	101.	* 2.4	*	.0	.1	.0	.4	.0	.2	.0	1.4
3. SW	*	82.	* 2.7	*	.3	.0	.0	.0	.4	.0	.2	1.6
4. NE	*	187.	* 2.6	*	1.2	.0	.0	.0	.2	.0	.0	.8
5. ES mdblk	*	278.	* 2.6	*	.0	.0	.0	.0	.0	.0	.1	2.1
6. WN mdblk	*	97.	* 1.7	*	.1	.0	.0	.0	.0	.0	.8	.3
7. WS mdblk	*	83.	* 2.0	*	.0	.0	.0	.0	.0	.0	1.2	.2
8. EN mdblk	*	262.	* 1.7	*	.1	.0	.0	.0	.0	.0	.1	1.3
9. SE mdblk	*	352.	* 2.0	*	1.1	.0	.0	.1	.2	.1	.0	.0
10. NW mdblk	*	172.	* 2.2	*	.2	.2	.0	.9	.0	.5	.0	.1
11. SW mdblk	*	7.	* 1.8	*	.3	.0	.0	.0	.8	.1	.0	.1
12. NE mdblk	*	187.	* 1.7	*	.1	.6	.0	.2	.1	.3	.0	.0
13. ES blk	*	276.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.5	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 1.5	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	*	.0	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.9	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0
17. SE blk	*	.0	.0	.0	.0	.8	.0	.0	.3	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.3	.9	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.4	.0	.0	.9	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.6	.4	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	4	-150	4	0	* AG	1477	9.7	.0	10.0
B. Grand Av NBD	*	4	0	4	150	* AG	1103	5.6	.0	10.0
C. Grand Av NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Grand Av SBA	*	-7	150	-7	0	* AG	1165	8.4	.0	10.0
E. Grand Av SBD	*	-7	0	-7	-150	* AG	1307	5.7	.0	10.0
F. Grand Av SBL	*	-5	150	0	0	* AG	204	11.4	.0	10.0
G. El Embar EBA	*	-150	0	0	0	* AG	0	5.6	.0	10.0
H. El Embar EBD	*	0	0	150	0	* AG	707	11.4	.0	10.0
I. El Embar EBL	*	-150	-2	0	0	* AG	0	5.6	.0	10.0
J. El Embar WBA	*	150	0	0	0	* AG	129	9.8	.0	10.0
K. El Embar WBD	*	0	0	-150	0	* AG	0	5.6	.0	10.0
L. El Embar WBL	*	150	2	0	0	* AG	142	10.6	.0	10.0
M. Grand A NBAX	*	4	-750	4	-150	* AG	1477	5.1	.0	10.0
N. Grand A NBDX	*	4	150	4	750	* AG	1103	5.1	.0	10.0
O. Grand A SBAX	*	-7	750	-7	150	* AG	1369	5.1	.0	10.0
P. Grand A SBDX	*	-7	-150	-7	-750	* AG	1307	5.1	.0	10.0
Q. El Emba EBAX	*	-750	0	-150	0	* AG	0	5.6	.0	10.0
R. El Emba EBDX	*	150	0	750	0	* AG	707	5.6	.0	10.0
S. El Emba WBAX	*	750	0	150	0	* AG	271	5.6	.0	10.0
T. El Emba WBDX	*	-150	0	-750	0	* AG	0	5.6	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-7	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-7	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	351.	2.6	*	.0	.8	.0	.5	.0	.2	.0	.5
2. NW	*	96.	2.5	*	.0	.2	.0	.6	.0	.1	.0	.9
3. SW	*	84.	2.5	*	.5	.0	.0	.0	.5	.0	.0	.9
4. NE	*	188.	3.2	*	1.8	.0	.0	.0	.3	.0	.0	.5
5. ES mdblk	*	279.	1.8	*	.0	.0	.0	.1	.0	.0	.0	1.2
6. WN mdblk	*	92.	.7	*	.0	.0	.0	.0	.0	.0	.0	.2
7. WS mdblk	*	89.	.7	*	.1	.0	.0	.0	.0	.0	.0	.2
8. EN mdblk	*	261.	2.0	*	.2	.0	.0	.0	.0	.0	.0	1.2
9. SE mdblk	*	353.	2.7	*	1.8	.0	.0	.2	.3	.0	.0	.0
10. NW mdblk	*	172.	2.5	*	.3	.3	.0	1.3	.0	.3	.0	.0
11. SW mdblk	*	9.	2.1	*	.7	.1	.0	.0	1.0	.0	.0	.0
12. NE mdblk	*	187.	2.0	*	.2	.8	.0	.4	.2	.2	.0	.0
13. ES blk	*	276.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	91.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	90.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	1.7	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	1.7	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	1.8	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	1.5	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. NW	*	.0	.2	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0
3. SW	*	.0	.2	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	*	.0	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.2	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.2	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.3	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.3	.0
17. SE blk	*	.0	.0	.0	.0	1.1	.0	.0	.4	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.4	1.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.5	.0	.0	1.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.9	.4	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	7	-150	7	0	* AG	354	7.5	.0	10.0
B. Lakeshor NBD	*	7	0	7	150	* AG	698	5.4	.0	10.0
C. Lakeshor NBL	*	5	-150	0	0	* AG	213	11.4	.0	10.0
D. Lakeshor SBA	*	-4	150	-4	0	* AG	444	7.7	.0	10.0
E. Lakeshor SBD	*	-4	0	-4	-150	* AG	578	5.4	.0	10.0
F. Lakeshor SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. Lake Par EBA	*	-150	-4	0	-4	* AG	173	9.6	.0	10.0
H. Lake Par EBD	*	0	-4	150	-4	* AG	0	5.1	.0	10.0
I. Lake Par EBL	*	-150	-5	0	0	* AG	74	10.5	.0	10.0
J. Lake Par WBA	*	150	5	0	5	* AG	1066	11.6	.0	11.8
K. Lake Par WBD	*	0	5	-150	5	* AG	1207	11.0	.0	10.0
L. Lake Par WBL	*	150	2	0	0	* AG	159	10.5	.0	10.0
M. Lakesho NBAX	*	7	-750	7	-150	* AG	567	5.1	.0	10.0
N. Lakesho NBDX	*	7	150	7	750	* AG	698	5.1	.0	10.0
O. Lakesho SBAX	*	-4	750	-4	150	* AG	444	5.1	.0	10.0
P. Lakesho SBDX	*	-4	-150	-4	-750	* AG	578	5.1	.0	10.0
Q. Lake Pa EBAX	*	-750	-4	-150	-4	* AG	247	5.1	.0	10.0
R. Lake Pa EBDX	*	150	-4	750	-4	* AG	0	5.1	.0	10.0
S. Lake Pa WBAX	*	750	5	150	5	* AG	1225	5.1	.0	11.8

T. Lake Pa WBDX	*	-150	5	-750	5	* AG	1207	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-10	12	1.8
3. SW	*	-10	-10	1.8
4. NE	*	14	13	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	12	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	13	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	12	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	13	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	279.	* 1.7	*	.2	.0	.1	.0	.1	.0	.2	.0
2. NW	*	98.	* 2.4	*	.0	.2	.0	.2	.0	.0	.0	.0
3. SW	*	79.	* 1.6	*	.1	.0	.1	.0	.2	.0	.0	.0
4. NE	*	261.	* 2.5	*	.0	.2	.0	.1	.0	.0	.1	.0
5. ES mdblk	*	278.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	98.	* 2.3	*	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	82.	* 1.6	*	.0	.0	.0	.0	.0	.0	.3	.0
8. EN mdblk	*	263.	* 2.3	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	* 1.3	*	.4	.0	.3	.0	.2	.0	.0	.0
10. NW mdblk	*	174.	* 1.2	*	.0	.1	.0	.5	.0	.0	.0	.0
11. SW mdblk	*	7.	* 1.2	*	.1	.0	.2	.0	.4	.0	.0	.0
12. NE mdblk	*	187.	* 1.2	*	.0	.5	.0	.2	.0	.0	.0	.0
13. ES blk	*	276.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.1	.0	.8	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. NW	*	.0	1.5	.2	.2	.0	.0	.0	.0	.0	.0	.1	.0
3. SW	*	.0	.8	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.3	1.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.7	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.1	1.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.2	.2	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	1.6	.2	.2	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.9
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.4
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.9	.0
17. SE blk	*	.0	.0	.0	.0	.5	.0	.0	.2	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.3	.4	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.2	.0	.0	.5	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.6	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	4	-150	4	0	* AG	1161	8.4	.0	10.0
B. Lakeshor NBD	*	4	0	4	150	* AG	430	5.4	.0	10.0
C. Lakeshor NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Lakeshor SBA	*	-7	150	-7	0	* AG	194	7.5	.0	10.0
E. Lakeshor SBD	*	-7	0	-7	-150	* AG	347	5.3	.0	10.0
F. Lakeshor SBL	*	-5	150	0	0	* AG	509	11.6	.0	10.0
G. MacArthu EBA	*	-150	-7	0	-7	* AG	1322	11.4	.0	11.8
H. MacArthu EBD	*	0	-7	150	-7	* AG	2607	11.5	.0	10.0
I. MacArthu EBL	*	-150	-5	0	0	* AG	198	10.5	.0	10.0
J. MacArthu WBA	*	150	0	0	0	* AG	0	5.1	.0	10.0
K. MacArthu WBD	*	0	0	-150	0	* AG	0	5.1	.0	10.0
L. MacArthu WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Lakesho NBAX	*	4	-750	4	-150	* AG	1161	5.1	.0	10.0
N. Lakesho NBDX	*	4	150	4	750	* AG	430	5.1	.0	10.0
O. Lakesho SBAX	*	-7	750	-7	150	* AG	703	5.1	.0	10.0
P. Lakesho SBDX	*	-7	-150	-7	-750	* AG	347	5.1	.0	10.0
Q. MacArth EBAX	*	-750	-7	-150	-7	* AG	1520	5.1	.0	11.8
R. MacArth EBDX	*	150	-7	750	-7	* AG	2607	5.1	.0	10.0
S. MacArth WBAX	*	750	0	150	0	* AG	0	5.1	.0	10.0

T. MacArth WBDX	*	-150	0	-750	0	* AG	0	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-14	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-14	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-14	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-14	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	PRED CONC (PPM)	*	A	B	C	CONC/LINK (PPM) D	E	F	G	H
1. SE	*	81.	3.7	*	.0	.0	.0	.0	.0	.0	.0	3.6
2. NW	*	105.	2.4	*	.0	.0	.0	.0	.0	.3	.0	1.8
3. SW	*	81.	3.7	*	.4	.0	.0	.0	.1	.0	.4	2.7
4. NE	*	187.	2.8	*	1.2	.0	.0	.0	.0	.0	.0	1.2
5. ES mdblk	*	279.	4.0	*	.0	.0	.0	.0	.0	.0	.1	3.6
6. WN mdblk	*	97.	1.8	*	.1	.0	.0	.0	.0	.0	.9	.4
7. WS mdblk	*	83.	2.7	*	.0	.0	.0	.0	.0	.0	1.9	.3
8. EN mdblk	*	259.	2.0	*	.1	.0	.0	.0	.0	.0	.1	1.7
9. SE mdblk	*	353.	2.0	*	1.3	.0	.0	.0	.0	.1	.1	.0
10. NW mdblk	*	172.	1.6	*	.2	.1	.0	.2	.0	.6	.0	.2
11. SW mdblk	*	8.	1.3	*	.4	.0	.0	.0	.3	.1	.0	.2
12. NE mdblk	*	186.	1.4	*	.2	.3	.0	.0	.0	.3	.1	.1
13. ES blk	*	277.	1.9	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.9	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.1
19. SW blk	*	6.	1.0	*	.0	.0	.0	.0	.0	.0	.0	.1
20. NE blk	*	186.	.9	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
7. WS mdblk	*	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.7	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	1.1	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.8	.0	.0
17. SE blk	*	.0	.0	.0	.0	.9	.0	.0	.1	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.2	.6	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.4	.0	.3	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.4	.3	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	4	-150	4	0	* AG	1184	8.4	.0	10.0
B. Lakeshor NBD	*	4	0	4	150	* AG	575	5.4	.0	10.0
C. Lakeshor NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Lakeshor SBA	*	-7	150	-7	0	* AG	532	7.7	.0	10.0
E. Lakeshor SBD	*	-7	0	-7	-150	* AG	1001	5.6	.0	10.0
F. Lakeshor SBL	*	-5	150	0	0	* AG	135	10.5	.0	10.0
G. E. 18th EBA	*	-150	0	0	0	* AG	0	5.1	.0	10.0
H. E. 18th EBD	*	0	0	150	0	* AG	787	11.4	.0	10.0
I. E. 18th EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. E. 18th WBA	*	150	4	0	4	* AG	43	9.6	.0	10.0
K. E. 18th WBD	*	0	4	-150	4	* AG	0	5.1	.0	10.0
L. E. 18th WBL	*	150	5	0	0	* AG	469	11.4	.0	10.0
M. Lakesho NBAX	*	4	-750	4	-150	* AG	1184	5.1	.0	10.0
N. Lakesho NBDX	*	4	150	4	750	* AG	575	5.1	.0	10.0
O. Lakesho SBAX	*	-7	750	-7	150	* AG	667	5.1	.0	10.0
P. Lakesho SBDX	*	-7	-150	-7	-750	* AG	1001	5.1	.0	10.0
Q. E. 18th EBAX	*	-750	0	-150	0	* AG	0	5.1	.0	10.0
R. E. 18th EBDX	*	150	0	750	0	* AG	787	5.1	.0	10.0
S. E. 18th WBAX	*	750	4	150	4	* AG	512	5.1	.0	10.0

T. E. 18th WBDX	*	-150	4	-750	4	* AG	0	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-7	1.8
2. NW	*	-14	10	1.8
3. SW	*	-14	-7	1.8
4. NE	*	10	10	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	81.	* 2.2	*	.0	.0	.0	.0	.0	.0	.0	1.3
2. NW	*	98.	* 2.0	*	.0	.1	.0	.3	.0	.0	.0	.8
3. SW	*	83.	* 2.7	*	.4	.0	.0	.0	.4	.0	.0	1.1
4. NE	*	187.	* 2.6	*	1.2	.0	.0	.0	.2	.0	.0	.5
5. ES mdblk	*	280.	* 2.0	*	.0	.0	.0	.0	.0	.0	.0	1.3
6. WN mdblk	*	92.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.2
7. WS mdblk	*	89.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.2
8. EN mdblk	*	260.	* 2.2	*	.1	.0	.0	.0	.0	.0	.0	.8
9. SE mdblk	*	352.	* 1.9	*	1.3	.0	.0	.0	.3	.0	.0	.0
10. NW mdblk	*	173.	* 1.5	*	.2	.1	.0	.6	.0	.2	.0	.0
11. SW mdblk	*	10.	* 1.6	*	.5	.0	.0	.0	.8	.0	.0	.1
12. NE mdblk	*	185.	* 1.3	*	.2	.4	.0	.1	.1	.0	.0	.0
13. ES blk	*	276.	* 1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	91.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	90.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* 1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	185.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.3	.1	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.3	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.4	.0
17. SE blk	*	.0	.0	.0	.0	.9	.0	.0	.3	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.2	.5	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.4	.0	.0	.8	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.5	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 1st Ave NBA'	*	4	-150	4	0	* AG	1833	11.1	.0	10.0
B. 1st Ave NBD	*	4	0	4	150	* AG	1332	5.7	.0	10.0
C. 1st Ave NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. 1st Ave SBA	*	-4	150	-4	0	* AG	995	8.1	.0	10.0
E. 1st Ave SBD	*	-4	0	-4	-150	* AG	1262	5.7	.0	10.0
F. 1st Ave SBL	*	-2	150	0	0	* AG	10	10.5	.0	10.0
G. Internat EBA	*	-150	0	0	0	* AG	0	5.1	.0	10.0
H. Internat EBD	*	0	0	150	0	* AG	582	10.5	.0	10.0
I. Internat EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. Internat WBA	*	150	4	0	4	* AG	71	9.6	.0	10.0
K. Internat WBD	*	0	4	-150	4	* AG	0	5.1	.0	10.0
L. Internat WBL	*	150	5	0	0	* AG	267	10.5	.0	10.0
M. 1st Ave NBAX	*	4	-750	4	-150	* AG	1833	5.1	.0	10.0
N. 1st Ave NBDX	*	4	150	4	750	* AG	1332	5.1	.0	10.0
O. 1st Ave SBAX	*	-4	750	-4	150	* AG	1005	5.1	.0	10.0
P. 1st Ave SBDX	*	-4	-150	-4	-750	* AG	1262	5.1	.0	10.0
Q. Interna EBAX	*	-750	0	-150	0	* AG	0	5.1	.0	10.0
R. Interna EBDX	*	150	0	750	0	* AG	582	5.1	.0	10.0
S. Interna WBAX	*	750	4	150	4	* AG	338	5.1	.0	10.0

T. Interna WBDX	*	-150	4	-750	4	* AG	0	5.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-7	1.8
2. NW	*	-10	10	1.8
3. SW	*	-10	-7	1.8
4. NE	*	10	10	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	189.	* 3.3	*	2.6	.0	.0	.0	.4	.0	.0	.0
2. NW	*	170.	* 2.4	*	1.2	.0	.0	.2	.8	.0	.0	.0
3. SW	*	83.	* 2.7	*	.8	.0	.0	.0	.5	.0	.0	.8
4. NE	*	188.	* 3.6	*	2.2	.1	.0	.0	.4	.0	.0	.3
5. ES mdblk	*	279.	* 1.5	*	.0	.0	.0	.1	.0	.0	.0	.9
6. WN mdblk	*	93.	* .7	*	.1	.0	.0	.0	.0	.0	.0	.2
7. WS mdblk	*	89.	* .7	*	.1	.0	.0	.0	.0	.0	.0	.2
8. EN mdblk	*	260.	* 1.6	*	.2	.0	.0	.0	.0	.0	.0	.6
9. SE mdblk	*	352.	* 3.4	*	2.6	.0	.0	.1	.4	.0	.0	.0
10. NW mdblk	*	173.	* 2.3	*	.3	.4	.0	1.1	.0	.0	.0	.0
11. SW mdblk	*	10.	* 2.6	*	1.2	.0	.0	.0	1.0	.0	.0	.0
12. NE mdblk	*	186.	* 2.1	*	.3	.9	.0	.4	.1	.0	.0	.0
13. ES blk	*	276.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	93.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	91.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .9	*	.1	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	* 2.0	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.6	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 1.9	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* 1.6	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.2	.1	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.1	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.2	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.3	.0
17. SE blk	*	.0	.0	.0	.0	1.3	.0	.0	.5	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.5	.8	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.7	.0	.0	1.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	1.0	.4	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 12th St NBA	*	7	-150	7	0	* AG	2480	8.9	.0	10.0
B. 12th St NBD	*	7	0	7	150	* AG	1572	5.4	.0	10.0
C. 12th St NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. 12th St SBA	*	-9	150	-9	0	* AG	1267	8.1	.0	10.0
E. 12th St SBD	*	-9	0	-9	-150	* AG	1433	5.5	.0	10.0
F. 12th St SBL	*	-5	150	0	0	* AG	5	10.5	.0	10.0
G. E. 12th EBA	*	-150	-2	0	-2	* AG	20	9.6	.0	10.0
H. E. 12th EBD	*	0	-2	150	-2	* AG	939	11.6	.0	10.0
I. E. 12th EBL	*	-150	-2	0	0	* AG	20	10.5	.0	10.0
J. E. 12th WBA	*	150	4	0	4	* AG	6	9.6	.0	10.0
K. E. 12th WBD	*	0	4	-150	4	* AG	5	5.9	.0	10.0
L. E. 12th WBL	*	150	5	0	0	* AG	151	10.5	.0	10.0
M. 12th St NBAX	*	7	-750	7	-150	* AG	2480	5.1	.0	10.0
N. 12th St NBDX	*	7	150	7	750	* AG	1572	5.1	.0	10.0
O. 12th St SBAX	*	-9	750	-9	150	* AG	1272	5.1	.0	10.0
P. 12th St SBDX	*	-9	-150	-9	-750	* AG	1433	5.1	.0	10.0
Q. E. 12th EBAX	*	-750	-2	-150	-2	* AG	40	5.1	.0	10.0
R. E. 12th EBDX	*	150	-2	750	-2	* AG	939	5.1	.0	10.0
S. E. 12th WBAX	*	750	4	150	4	* AG	157	5.1	.0	10.0

T. E. 12th WBDX	*	-150	4	-750	4	* AG	5	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-8	1.8
2. NW	*	-15	10	1.8
3. SW	*	-15	-8	1.8
4. NE	*	14	10	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-15	150	1.8
11. SW mdblk	*	-15	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-15	600	1.8
19. SW blk	*	-15	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	189.	* 3.3	*	2.6	.0	.0	.0	.2	.0	.0	.0
2. NW	*	168.	* 2.1	*	.8	.0	.0	.2	.9	.0	.0	.0
3. SW	*	84.	* 2.7	*	.6	.0	.0	.0	.5	.0	.0	1.2
4. NE	*	188.	* 3.6	*	2.3	.1	.0	.0	.2	.0	.0	.5
5. ES mdblk	*	279.	* 2.0	*	.0	.0	.0	.1	.0	.0	.0	1.5
6. WN mdblk	*	93.	* .8	*	.1	.0	.0	.0	.0	.0	.0	.3
7. WS mdblk	*	88.	* .8	*	.1	.0	.0	.0	.0	.0	.0	.3
8. EN mdblk	*	258.	* 1.6	*	.2	.0	.0	.0	.0	.0	.0	.9
9. SE mdblk	*	352.	* 3.4	*	2.6	.0	.0	.2	.2	.0	.0	.0
10. NW mdblk	*	172.	* 2.4	*	.4	.2	.0	1.4	.0	.0	.0	.1
11. SW mdblk	*	12.	* 2.2	*	.7	.1	.0	.0	1.0	.0	.0	.1
12. NE mdblk	*	186.	* 2.0	*	.3	1.0	.0	.2	.2	.0	.0	.0
13. ES blk	*	276.	* 1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	93.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	89.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .9	*	.1	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* 2.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	* 1.7	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 1.9	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	* 1.7	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0
4. NE	*	.0	.0	.0	.0	.2	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
8. EN mdblk	*	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.1	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.2	.0
17. SE blk	*	.0	.0	.0	.0	1.6	.0	.0	.4	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.4	1.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.5	.0	.0	1.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	1.1	.4	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 2nd Ave NBA	*	2	-150	2	0	* AG	219	8.6	.0	10.0
B. 2nd Ave NBD	*	2	0	2	150	* AG	235	6.0	.0	10.0
C. 2nd Ave NBL	*	2	-150	0	0	* AG	0	5.6	.0	10.0
D. 2nd Ave SBA	*	-2	150	-2	0	* AG	32	8.4	.0	10.0
E. 2nd Ave SBD	*	-2	0	-2	-150	* AG	62	6.0	.0	10.0
F. 2nd Ave SBL	*	-2	150	0	0	* AG	7	10.6	.0	10.0
G. E. 15th EBA	*	-150	-2	0	-2	* AG	431	8.6	.0	10.0
H. E. 15th EBD	*	0	-2	150	-2	* AG	420	6.0	.0	10.0
I. E. 15th EBL	*	-150	-2	0	0	* AG	28	10.6	.0	10.0
J. E. 15th WBA	*	150	0	0	0	* AG	0	5.6	.0	10.0
K. E. 15th WBD	*	0	0	-150	0	* AG	0	5.6	.0	10.0
L. E. 15th WBL	*	150	2	0	0	* AG	0	5.6	.0	10.0
M. 2nd Ave NBAX	*	2	-750	2	-150	* AG	219	5.6	.0	10.0
N. 2nd Ave NBDX	*	2	150	2	750	* AG	235	5.6	.0	10.0
O. 2nd Ave SBAX	*	-2	750	-2	150	* AG	39	5.6	.0	10.0
P. 2nd Ave SBDX	*	-2	-150	-2	-750	* AG	62	5.6	.0	10.0
Q. E. 15th EBAX	*	-750	-2	-150	-2	* AG	459	5.6	.0	10.0
R. E. 15th EBDX	*	150	-2	750	-2	* AG	420	5.6	.0	10.0
S. E. 15th WBAX	*	750	0	150	0	* AG	0	5.6	.0	10.0

T. E. 15th WBDX	*	-150	0	-750	0	* AG	0	5.6	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-8	1.8
2. NW	*	-8	8	1.8
3. SW	*	-8	-8	1.8
4. NE	*	8	8	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	.8	*	.1	.0	.0	.0	.0	.0	.5	.0
2. NW	*	174.	.6	*	.2	.0	.0	.0	.0	.0	.2	.0
3. SW	*	277.	.7	*	.0	.0	.0	.0	.0	.0	.5	.0
4. NE	*	263.	.7	*	.0	.0	.0	.0	.0	.0	.4	.0
5. ES mdblk	*	275.	.5	*	.0	.0	.0	.0	.0	.0	.0	.3
6. WN mdblk	*	98.	.6	*	.0	.0	.0	.0	.0	.0	.4	.0
7. WS mdblk	*	83.	.7	*	.0	.0	.0	.0	.0	.0	.5	.0
8. EN mdblk	*	264.	.5	*	.0	.0	.0	.0	.0	.0	.0	.3
9. SE mdblk	*	354.	.5	*	.3	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	175.	.4	*	.0	.1	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	6.	.4	*	.2	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	186.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	275.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	85.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	175.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	5.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	185.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 2nd Ave NBA	*	2	-150	2	0	* AG	219	8.6	.0	10.0
B. 2nd Ave NBD	*	2	0	2	150	* AG	235	6.0	.0	10.0
C. 2nd Ave NBL	*	2	-150	0	0	* AG	0	5.6	.0	10.0
D. 2nd Ave SBA	*	-2	150	-2	0	* AG	32	8.4	.0	10.0
E. 2nd Ave SBD	*	-2	0	-2	-150	* AG	62	6.0	.0	10.0
F. 2nd Ave SBL	*	-2	150	0	0	* AG	7	10.6	.0	10.0
G. E. 15th EBA	*	-150	-2	0	-2	* AG	431	8.6	.0	10.0
H. E. 15th EBD	*	0	-2	150	-2	* AG	420	6.0	.0	10.0
I. E. 15th EBL	*	-150	-2	0	0	* AG	28	10.6	.0	10.0
J. E. 15th WBA	*	150	0	0	0	* AG	0	5.6	.0	10.0
K. E. 15th WBD	*	0	0	-150	0	* AG	0	5.6	.0	10.0
L. E. 15th WBL	*	150	2	0	0	* AG	0	5.6	.0	10.0
M. 2nd Ave NBAX	*	2	-750	2	-150	* AG	219	5.6	.0	10.0
N. 2nd Ave NBDX	*	2	150	2	750	* AG	235	5.6	.0	10.0
O. 2nd Ave SBAX	*	-2	750	-2	150	* AG	39	5.6	.0	10.0
P. 2nd Ave SBDX	*	-2	-150	-2	-750	* AG	62	5.6	.0	10.0
Q. E. 15th EBAX	*	-750	-2	-150	-2	* AG	459	5.6	.0	10.0
R. E. 15th EBDX	*	150	-2	750	-2	* AG	420	5.6	.0	10.0
S. E. 15th WBAX	*	750	0	150	0	* AG	0	5.6	.0	10.0

T. E. 15th WBDX	*	-150	0	-750	0	* AG	0	5.6	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-8	1.8
2. NW	*	-8	7	1.8
3. SW	*	-8	-8	1.8
4. NE	*	8	7	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	.8	*	.1	.0	.0	.0	.0	.0	.5	.0
2. NW	*	174.	.6	*	.2	.0	.0	.0	.0	.0	.2	.0
3. SW	*	277.	.7	*	.0	.0	.0	.0	.0	.0	.5	.0
4. NE	*	263.	.7	*	.0	.0	.0	.0	.0	.0	.4	.0
5. ES mdblk	*	275.	.5	*	.0	.0	.0	.0	.0	.0	.0	.3
6. WN mdblk	*	98.	.6	*	.0	.0	.0	.0	.0	.0	.4	.0
7. WS mdblk	*	83.	.7	*	.0	.0	.0	.0	.0	.0	.5	.0
8. EN mdblk	*	264.	.5	*	.0	.0	.0	.0	.0	.0	.0	.3
9. SE mdblk	*	354.	.5	*	.3	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	175.	.4	*	.0	.1	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	6.	.4	*	.2	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	186.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	275.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	85.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	175.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	5.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	185.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-0 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 5th Ave NBA	*	2	-150	2	0	* AG	386	10.8	.0	10.0
B. 5th Ave NBD	*	2	0	2	150	* AG	373	7.1	.0	10.0
C. 5th Ave NBL	*	2	-150	0	0	* AG	54	10.6	.0	10.0
D. 5th Ave SBA	*	-2	150	-2	0	* AG	208	10.1	.0	10.0
E. 5th Ave SBD	*	-2	0	-2	-150	* AG	276	6.6	.0	10.0
F. 5th Ave SBL	*	-2	150	0	0	* AG	46	10.6	.0	10.0
G. E. 12th EBA	*	-150	-2	0	-2	* AG	660	7.9	.0	13.5
H. E. 12th EBD	*	0	-2	150	-2	* AG	734	5.4	.0	11.8
I. E. 12th EBL	*	-150	-2	0	0	* AG	23	10.5	.0	10.0
J. E. 12th WBA	*	150	2	0	2	* AG	434	7.7	.0	13.5
K. E. 12th WBD	*	0	2	-150	2	* AG	453	5.4	.0	11.8
L. E. 12th WBL	*	150	2	0	0	* AG	25	10.5	.0	10.0
M. 5th Ave NBAX	*	2	-750	2	-150	* AG	440	5.6	.0	10.0
N. 5th Ave NBDX	*	2	150	2	750	* AG	373	5.6	.0	10.0
O. 5th Ave SBAX	*	-2	750	-2	150	* AG	254	5.6	.0	10.0
P. 5th Ave SBDX	*	-2	-150	-2	-750	* AG	276	5.6	.0	10.0
Q. E. 12th EBAX	*	-750	-2	-150	-2	* AG	683	5.1	.0	13.5
R. E. 12th EBDX	*	150	-2	750	-2	* AG	734	5.1	.0	11.8
S. E. 12th WBAX	*	750	2	150	2	* AG	459	5.1	.0	13.5

T. E. 12th WBDX	*	-150	2	-750	2	* AG	453	5.1	.0	11.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-9	1.8
2. NW	*	-8	9	1.8
3. SW	*	-8	-10	1.8
4. NE	*	8	10	1.8
5. ES mdblk	*	150	-9	1.8
6. WN mdblk	*	-150	9	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-9	1.8
14. WN blk	*	-600	9	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	* 1.5	*	.3	.0	.0	.0	.0	.0	.7	.0
2. NW	*	172.	* 1.3	*	.4	.0	.0	.0	.3	.0	.3	.0
3. SW	*	82.	* 1.4	*	.2	.0	.0	.0	.1	.0	.0	.5
4. NE	*	187.	* 1.4	*	.6	.0	.0	.0	.2	.0	.0	.2
5. ES mdblk	*	276.	* 1.2	*	.0	.0	.0	.0	.0	.0	.1	.5
6. WN mdblk	*	96.	* 1.2	*	.0	.0	.0	.0	.0	.0	.4	.0
7. WS mdblk	*	84.	* 1.3	*	.0	.0	.0	.0	.0	.0	.6	.0
8. EN mdblk	*	264.	* 1.2	*	.0	.0	.0	.0	.0	.0	.1	.3
9. SE mdblk	*	353.	* 1.2	*	.6	.0	.1	.0	.2	.0	.0	.0
10. NW mdblk	*	174.	* 1.0	*	.1	.2	.0	.3	.0	.0	.0	.0
11. SW mdblk	*	7.	* 1.0	*	.4	.0	.0	.0	.3	.0	.0	.0
12. NE mdblk	*	186.	* 1.0	*	.0	.4	.0	.2	.0	.0	.0	.0
13. ES blk	*	276.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	* .8	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	175.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	5.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	185.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0	.0
2. NW	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.3	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.4
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.3
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.4	.0
17. SE blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.2	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.3	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.4	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 5th Ave NBA	*	2	-150	2	0	* AG	3	8.4	.0	10.0
B. 5th Ave NBD	*	2	0	2	150	* AG	423	6.2	.0	10.0
C. 5th Ave NBL	*	2	-150	0	0	* AG	1	10.6	.0	10.0
D. 5th Ave SBA	*	-4	150	-4	0	* AG	47	8.4	.0	10.0
E. 5th Ave SBD	*	-4	0	-4	-150	* AG	6	6.0	.0	10.0
F. 5th Ave SBL	*	-2	150	0	0	* AG	314	11.6	.0	10.0
G. Embarcad EBA	*	-150	-2	0	-2	* AG	432	9.2	.0	10.0
H. Embarcad EBD	*	0	-2	150	-2	* AG	745	7.8	.0	10.0
I. Embarcad EBL	*	-150	-2	0	0	* AG	40	10.6	.0	10.0
J. Embarcad WBA	*	150	4	0	4	* AG	565	9.6	.0	10.0
K. Embarcad WBD	*	0	4	-150	4	* AG	230	6.0	.0	10.0
L. Embarcad WBL	*	150	2	0	0	* AG	2	10.6	.0	10.0
M. 5th Ave NBAX	*	2	-750	2	-150	* AG	4	5.6	.0	10.0
N. 5th Ave NBDX	*	2	150	2	750	* AG	423	5.6	.0	10.0
O. 5th Ave SBAX	*	-4	750	-4	150	* AG	361	5.6	.0	10.0
P. 5th Ave SBDX	*	-4	-150	-4	-750	* AG	6	5.6	.0	10.0
Q. Embarca EBAX	*	-750	-2	-150	-2	* AG	472	5.6	.0	10.0
R. Embarca EBDX	*	150	-2	750	-2	* AG	745	5.6	.0	10.0
S. Embarca WBAX	*	750	4	150	4	* AG	567	5.6	.0	10.0

T. Embarca WBDX	*	-150	4	-750	4	* AG	230	5.6	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-8	1.8
2. NW	*	-10	10	1.8
3. SW	*	-10	-8	1.8
4. NE	*	8	10	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	353.	1.6	*	.0	.4	.0	.0	.0	.4	.0	.4
2. NW	*	97.	1.7	*	.0	.1	.0	.0	.0	.2	.0	.4
3. SW	*	83.	1.4	*	.0	.0	.0	.0	.0	.0	.0	.7
4. NE	*	98.	1.4	*	.0	.0	.0	.0	.0	.0	.0	.4
5. ES mdblk	*	279.	1.5	*	.0	.0	.0	.0	.0	.0	.0	.8
6. WN mdblk	*	95.	1.0	*	.0	.0	.0	.0	.0	.0	.3	.1
7. WS mdblk	*	84.	1.2	*	.0	.0	.0	.0	.0	.0	.6	.1
8. EN mdblk	*	262.	1.4	*	.0	.0	.0	.0	.0	.0	.0	.4
9. SE mdblk	*	358.	.5	*	.0	.0	.0	.0	.0	.1	.0	.0
10. NW mdblk	*	169.	.9	*	.0	.2	.0	.0	.0	.5	.0	.0
11. SW mdblk	*	3.	.5	*	.0	.0	.0	.0	.0	.1	.0	.0
12. NE mdblk	*	190.	.9	*	.0	.4	.0	.0	.0	.4	.0	.0
13. ES blk	*	276.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	95.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.8	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	360.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.7	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	2.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.7	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.7	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
3. SW	*	.0	.4	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0
4. NE	*	.0	.8	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
5. ES mdblk	*	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.1	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.8	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	.3	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.2
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.2
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.5	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.3	.4	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.4	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	4	-150	4	0	* AG	420	9.6	.0	15.3
B. Oak St NBD	*	4	0	4	150	* AG	797	6.1	.0	13.5
C. Oak St NBL	*	2	-150	0	0	* AG	106	10.5	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	5.1	.0	10.0
E. Oak St SBD	*	0	0	0	-150	* AG	0	5.1	.0	10.0
F. Oak St SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. 14th St EBA	*	-150	-4	0	-4	* AG	749	7.9	.0	10.0
H. 14th St EBD	*	0	-4	150	-4	* AG	763	5.4	.0	10.0
I. 14th St EBL	*	-150	-2	0	0	* AG	78	10.5	.0	10.0
J. 14th St WBA	*	150	4	0	4	* AG	593	7.7	.0	10.0
K. 14th St WBD	*	0	4	-150	4	* AG	386	5.3	.0	10.0
L. 14th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Oak St NBAX	*	4	-750	4	-150	* AG	526	5.1	.0	15.3
N. Oak St NBDX	*	4	150	4	750	* AG	797	5.1	.0	13.5
O. Oak St SBAX	*	0	750	0	150	* AG	0	5.1	.0	10.0
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	5.1	.0	10.0
Q. 14th St EBAX	*	-750	-4	-150	-4	* AG	827	5.1	.0	10.0
R. 14th St EBDX	*	150	-4	750	-4	* AG	763	5.1	.0	10.0
S. 14th St WBAX	*	750	4	150	4	* AG	593	5.1	.0	10.0

T. 14th St WBDX	*	-150	4	-750	4	* AG	386	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	13	-10	1.8
2. NW	*	-7	10	1.8
3. SW	*	-7	-10	1.8
4. NE	*	12	10	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	13	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	13	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	* 1.5	*	.2	.0	.0	.0	.0	.0	.7	.0
2. NW	*	97.	* 1.4	*	.0	.3	.0	.0	.0	.0	.0	.3
3. SW	*	83.	* 1.4	*	.2	.0	.0	.0	.0	.0	.0	.5
4. NE	*	261.	* 1.3	*	.0	.3	.0	.0	.0	.0	.4	.0
5. ES mdblk	*	277.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.6
6. WN mdblk	*	97.	* 1.1	*	.0	.0	.0	.0	.0	.0	.4	.0
7. WS mdblk	*	83.	* 1.4	*	.0	.0	.0	.0	.0	.0	.8	.0
8. EN mdblk	*	263.	* 1.3	*	.0	.0	.0	.0	.0	.0	.1	.2
9. SE mdblk	*	353.	* .9	*	.5	.0	.1	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	* .8	*	.1	.4	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	7.	* .9	*	.4	.0	.2	.0	.0	.0	.0	.0
12. NE mdblk	*	186.	* .9	*	.0	.6	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	* .6	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* .6	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	* .5	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.1	.0	.1	.0	.0	.0	.0	.0	.1	.0	.0	.0
2. NW	*	.0	.6	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
3. SW	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0
4. NE	*	.1	.1	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.3	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.3
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0	.2
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.5	.0
17. SE blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	5	-150	5	0	* AG	808	7.7	.0	10.0
B. Oak St NBD	*	5	0	5	150	* AG	836	5.4	.0	10.0
C. Oak St NBL	*	2	-150	0	0	* AG	88	10.5	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	5.1	.0	11.8
E. Oak St SBD	*	0	0	0	-150	* AG	0	5.1	.0	11.8
F. Oak St SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. 10th St EBA	*	-150	-4	0	-4	* AG	60	9.6	.0	17.0
H. 10th St EBD	*	0	-4	150	-4	* AG	134	5.9	.0	15.3
I. 10th St EBL	*	-150	-2	0	0	* AG	2	10.5	.0	10.0
J. 10th St WBA	*	150	2	0	2	* AG	308	10.8	.0	10.0
K. 10th St WBD	*	0	2	-150	2	* AG	296	6.1	.0	10.0
L. 10th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Oak St NBAX	*	5	-750	5	-150	* AG	896	5.1	.0	10.0
N. Oak St NBDX	*	5	150	5	750	* AG	836	5.1	.0	10.0
O. Oak St SBAX	*	0	750	0	150	* AG	0	5.1	.0	11.8
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	5.1	.0	11.8
Q. 10th St EBAX	*	-750	-4	-150	-4	* AG	62	5.1	.0	17.0
R. 10th St EBDX	*	150	-4	750	-4	* AG	134	5.1	.0	15.3
S. 10th St WBAX	*	750	2	150	2	* AG	308	5.1	.0	10.0

T. 10th St WBDX	*	-150	2	-750	2	* AG	296	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	12	-13	1.8
2. NW	*	-7	8	1.8
3. SW	*	-7	-14	1.8
4. NE	*	12	8	1.8
5. ES mdblk	*	150	-13	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	12	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-13	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	12	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	188.	1.1	*	.9	.0	.0	.0	.0	.0	.0	.0
2. NW	*	171.	.9	*	.5	.0	.1	.0	.0	.0	.0	.0
3. SW	*	81.	.8	*	.3	.0	.0	.0	.0	.0	.0	.1
4. NE	*	187.	1.3	*	.8	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	277.	.5	*	.0	.0	.0	.0	.0	.0	.0	.1
6. WN mdblk	*	96.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	84.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	263.	.8	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	1.1	*	.9	.0	.1	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.6	*	.1	.3	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	9.	.8	*	.4	.0	.1	.0	.0	.0	.0	.0
12. NE mdblk	*	185.	.9	*	.1	.6	.0	.0	.0	.0	.0	.0
13. ES blk	*	275.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	95.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	85.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.8	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.8	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.1	.0	.1	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.3	.0
17. SE blk	*	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Madison NBA	*	0	-150	0	0	* AG	0	5.1	.0	13.5
B. Madison NBD	*	0	0	0	150	* AG	0	5.1	.0	11.8
C. Madison NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Madison SBA	*	-5	150	-5	0	* AG	838	10.0	.0	10.0
E. Madison SBD	*	-5	0	-5	-150	* AG	1143	6.8	.0	10.0
F. Madison SBL	*	-2	150	0	0	* AG	285	11.4	.0	10.0
G. 7th St EBA	*	-150	-7	0	-7	* AG	1405	7.9	.0	15.3
H. 7th St EBD	*	0	-7	150	-7	* AG	1385	5.4	.0	15.3
I. 7th St EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. 7th St WBA	*	150	0	0	0	* AG	0	5.1	.0	10.0
K. 7th St WBD	*	0	0	-150	0	* AG	0	5.1	.0	10.0
L. 7th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Madison NBAX	*	0	-750	0	-150	* AG	0	5.1	.0	13.5
N. Madison NBDX	*	0	150	0	750	* AG	0	5.1	.0	11.8
O. Madison SBAX	*	-5	750	-5	150	* AG	1123	5.1	.0	10.0
P. Madison SBDX	*	-5	-150	-5	-750	* AG	1143	5.1	.0	10.0
Q. 7th St EBAX	*	-750	-7	-150	-7	* AG	1405	5.1	.0	15.3
R. 7th St EBDX	*	150	-7	750	-7	* AG	1385	5.1	.0	15.3
S. 7th St WBAX	*	750	0	150	0	* AG	0	5.1	.0	10.0
T. 7th St WBDX	*	-150	0	-750	0	* AG	0	5.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-16	1.8
2. NW	*	-12	7	1.8
3. SW	*	-12	-16	1.8
4. NE	*	7	7	1.8
5. ES mdblk	*	150	-16	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-16	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-12	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	7	150	1.8
13. ES blk	*	600	-16	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-16	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-12	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	7	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	* 1.7	*	.0	.0	.0	.0	.3	.0	1.2	.0
2. NW	*	173.	* 1.7	*	.0	.0	.0	.0	1.0	.0	.5	.0
3. SW	*	8.	* 2.2	*	.0	.0	.0	.9	.2	.3	.6	.0
4. NE	*	260.	* 1.6	*	.0	.0	.0	.4	.0	.2	.8	.0
5. ES mdblk	*	276.	* 1.3	*	.0	.0	.0	.0	.0	.0	.2	.8
6. WN mdblk	*	99.	* 1.1	*	.0	.0	.0	.0	.0	.0	.8	.1
7. WS mdblk	*	82.	* 1.6	*	.0	.0	.0	.0	.0	.0	1.3	.1
8. EN mdblk	*	264.	* .9	*	.0	.0	.0	.0	.0	.0	.2	.4
9. SE mdblk	*	353.	* .9	*	.0	.0	.0	.2	.4	.0	.1	.0
10. NW mdblk	*	172.	* 1.8	*	.0	.0	.0	1.2	.0	.3	.0	.0
11. SW mdblk	*	6.	* 1.4	*	.0	.0	.0	.2	1.0	.0	.0	.0
12. NE mdblk	*	189.	* 1.3	*	.0	.0	.0	.6	.1	.4	.1	.0
13. ES blk	*	276.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* .8	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .8	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	1.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.9	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.9	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	5	-150	5	0	* AG	971	10.8	.0	10.0
B. Oak St NBD	*	5	0	5	150	* AG	919	6.8	.0	10.0
C. Oak St NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	5.1	.0	10.0
E. Oak St SBD	*	0	0	0	-150	* AG	0	5.1	.0	10.0
F. Oak St SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. 7th St EBA	*	-150	-7	0	-7	* AG	1024	7.7	.0	13.5
H. 7th St EBD	*	0	-7	150	-7	* AG	1262	5.4	.0	11.8
I. 7th St EBL	*	-150	-2	0	0	* AG	186	10.5	.0	10.0
J. 7th St WBA	*	150	0	0	0	* AG	0	5.1	.0	13.5
K. 7th St WBD	*	0	0	-150	0	* AG	0	5.1	.0	13.5
L. 7th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Oak St NBAX	*	5	-750	5	-150	* AG	971	5.1	.0	10.0
N. Oak St NBDX	*	5	150	5	750	* AG	919	5.1	.0	10.0
O. Oak St SBAX	*	0	750	0	150	* AG	0	5.1	.0	10.0
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	5.1	.0	10.0
Q. 7th St EBAX	*	-750	-7	-150	-7	* AG	1210	5.1	.0	13.5
R. 7th St EBDX	*	150	-7	750	-7	* AG	1262	5.1	.0	11.8
S. 7th St WBAX	*	750	0	150	0	* AG	0	5.1	.0	13.5
T. 7th St WBDX	*	-150	0	-750	0	* AG	0	5.1	.0	13.5

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	12	-14	1.8
2. NW	*	-7	8	1.8
3. SW	*	-7	-15	1.8
4. NE	*	12	8	1.8
5. ES mdblk	*	150	-14	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-15	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	12	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-14	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-15	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	12	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	2.0	*	.7	.0	.0	.0	.0	.0	.9	.1
2. NW	*	170.	1.4	*	.8	.0	.0	.0	.0	.0	.3	.0
3. SW	*	83.	1.4	*	.5	.0	.0	.0	.0	.0	.0	.7
4. NE	*	187.	1.8	*	1.3	.0	.0	.0	.0	.0	.0	.3
5. ES mdblk	*	276.	1.2	*	.0	.0	.0	.0	.0	.0	.1	.8
6. WN mdblk	*	99.	1.0	*	.1	.0	.0	.0	.0	.0	.5	.1
7. WS mdblk	*	82.	1.4	*	.0	.0	.0	.0	.0	.0	1.0	.0
8. EN mdblk	*	263.	.8	*	.1	.0	.0	.0	.0	.0	.2	.3
9. SE mdblk	*	352.	1.7	*	1.4	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.8	*	.2	.4	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	9.	1.0	*	.8	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	186.	1.2	*	.2	.8	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	1.1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.7	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	1.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	.7	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.9	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.9	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-1 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.1	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
2. NW	*	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
4. NE	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.9	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.9	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0
17. SE blk	*	.0	.0	.0	.0	.8	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Conventi NBA	*	2	-150	2	0	* AG	10	9.8	.0	10.0
B. Conventi NBD	*	2	0	2	150	* AG	0	5.6	.0	10.0
C. Conventi NBL	*	2	-150	0	0	* AG	0	5.6	.0	10.0
D. Conventi SBA	*	0	150	0	0	* AG	0	5.6	.0	13.5
E. Conventi SBD	*	0	0	0	-150	* AG	10	6.4	.0	13.5
F. Conventi SBL	*	-2	150	0	0	* AG	0	5.6	.0	10.0
G. 12th St EBA	*	-150	-5	0	-5	* AG	2401	10.6	.0	13.5
H. 12th St EBD	*	0	-5	150	-5	* AG	2401	6.6	.0	10.0
I. 12th St EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. 12th St WBA	*	150	5	0	5	* AG	1403	8.1	.0	10.0
K. 12th St WBD	*	0	5	-150	5	* AG	1403	5.5	.0	10.0
L. 12th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. Convent NBAX	*	2	-750	2	-150	* AG	10	5.6	.0	10.0
N. Convent NBDX	*	2	150	2	750	* AG	0	5.6	.0	10.0
O. Convent SBAX	*	0	750	0	150	* AG	0	5.6	.0	13.5
P. Convent SBDX	*	0	-150	0	-750	* AG	10	5.6	.0	13.5
Q. 12th St EBAX	*	-750	-5	-150	-5	* AG	2401	5.1	.0	13.5
R. 12th St EBDX	*	150	-5	750	-5	* AG	2401	5.1	.0	10.0
S. 12th St WBAX	*	750	5	150	5	* AG	1403	5.1	.0	10.0

T. 12th St WBDX	*	-150	5	-750	5	* AG	1403	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-12	1.8
2. NW	*	-8	12	1.8
3. SW	*	-8	-14	1.8
4. NE	*	8	12	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	12	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	12	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	12	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	12	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	3.9	*	.0	.0	.0	.0	.0	.0	3.0	.1
2. NW	*	260.	2.5	*	.0	.0	.0	.0	.0	.0	1.2	.0
3. SW	*	279.	3.6	*	.0	.0	.0	.0	.0	.0	2.9	.0
4. NE	*	260.	2.6	*	.0	.0	.0	.0	.0	.0	1.3	.0
5. ES mdblk	*	277.	3.0	*	.0	.0	.0	.0	.0	.0	.3	1.8
6. WN mdblk	*	99.	2.6	*	.0	.0	.0	.0	.0	.0	1.1	.2
7. WS mdblk	*	82.	3.8	*	.0	.0	.0	.0	.0	.0	2.9	.2
8. EN mdblk	*	262.	2.8	*	.0	.0	.0	.0	.0	.0	.4	.6
9. SE mdblk	*	322.	.5	*	.0	.0	.0	.0	.0	.0	.3	.0
10. NW mdblk	*	213.	.4	*	.0	.0	.0	.0	.0	.0	.3	.0
11. SW mdblk	*	325.	.4	*	.0	.0	.0	.0	.0	.0	.3	.0
12. NE mdblk	*	216.	.4	*	.0	.0	.0	.0	.0	.0	.3	.0
13. ES blk	*	277.	2.3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	2.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	83.	2.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	1.9	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	.3	*	.0	.0	.0	.0	.0	.0	.1	.0
18. NW blk	*	184.	.2	*	.0	.0	.0	.0	.0	.0	.1	.0
19. SW blk	*	360.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.3	.0	.0	.0	.0	.0	.2	.0	.0	.2
2. NW	*	.0	.0	1.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
3. SW	*	.0	.0	.3	.0	.0	.0	.0	.0	.2	.0	.0	.2
4. NE	*	.0	.1	.9	.0	.0	.0	.0	.0	.2	.0	.0	.0
5. ES mdblk	*	.0	.4	.2	.0	.0	.0	.0	.0	.1	.0	.0	.1
6. WN mdblk	*	.0	.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.2	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	1.5	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
9. SE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	1.6	.5	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.8	.0	.0	1.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	1.6	.0	.0	.4
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.7	1.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 1st Ave NBA	*	11	-150	11	0	* AG	593	7.7	.0	10.0
B. 1st Ave NBD	*	11	0	11	150	* AG	593	5.4	.0	10.0
C. 1st Ave NBL	*	9	-150	0	0	* AG	810	11.6	.0	10.0
D. 1st Ave SBA	*	-5	150	-5	0	* AG	1391	8.1	.0	10.0
E. 1st Ave SBD	*	-5	0	-5	-150	* AG	2401	6.6	.0	10.0
F. 1st Ave SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. 11th/12t EBA	*	-150	-5	0	-5	* AG	1010	11.6	.0	13.5
H. 11th/12t EBD	*	0	-5	150	-5	* AG	0	5.1	.0	10.0
I. 11th/12t EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. 11th/12t WBA	*	150	0	0	0	* AG	0	5.1	.0	10.0
K. 11th/12t WBD	*	0	0	-150	0	* AG	810	10.5	.0	10.0
L. 11th/12t WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. 1st Ave NBAX	*	11	-750	11	-150	* AG	1403	5.1	.0	10.0
N. 1st Ave NBDX	*	11	150	11	750	* AG	593	5.1	.0	10.0
O. 1st Ave SBAX	*	-5	750	-5	150	* AG	1391	5.1	.0	10.0
P. 1st Ave SBDX	*	-5	-150	-5	-750	* AG	2401	5.1	.0	10.0
Q. 11th/12 EBAX	*	-750	-5	-150	-5	* AG	1010	5.1	.0	13.5
R. 11th/12 EBDX	*	150	-5	750	-5	* AG	0	5.1	.0	10.0
S. 11th/12 WBAX	*	750	0	150	0	* AG	0	5.1	.0	10.0

T. 11th/12 WBDX	*	-150	0	-750	0	* AG	810	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	17	-12	1.8
2. NW	*	-12	7	1.8
3. SW	*	-12	-14	1.8
4. NE	*	17	7	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	17	-150	1.8
10. NW mdblk	*	-12	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	17	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	17	-600	1.8
18. NW blk	*	-12	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	17	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	* 3.3	*	.3	.0	.4	.0	.5	.0	1.3	.0
2. NW	*	170.	* 4.1	*	.2	.0	.7	.0	1.8	.0	.6	.0
3. SW	*	9.	* 3.1	*	.0	.1	.0	1.2	.4	.0	.7	.0
4. NE	*	262.	* 2.7	*	.0	.2	.0	.3	.0	.0	1.0	.0
5. ES mdblk	*	272.	* 1.0	*	.0	.0	.0	.0	.1	.0	.3	.0
6. WN mdblk	*	102.	* 2.6	*	.0	.0	.1	.0	.2	.0	1.0	.0
7. WS mdblk	*	79.	* 2.3	*	.0	.0	.0	.1	.0	.0	1.5	.0
8. EN mdblk	*	267.	* 1.0	*	.0	.0	.0	.0	.0	.0	.3	.0
9. SE mdblk	*	347.	* 2.7	*	.6	.0	1.1	.1	.6	.0	.2	.0
10. NW mdblk	*	174.	* 2.4	*	.1	.0	.2	1.4	.2	.0	.0	.0
11. SW mdblk	*	9.	* 2.9	*	.2	.0	.5	.0	1.9	.0	.0	.0
12. NE mdblk	*	187.	* 1.7	*	.0	.5	.2	.3	.3	.0	.0	.0
13. ES blk	*	269.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* 1.5	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* 1.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	268.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* 1.9	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* 1.5	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* 2.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.6	.0	.0	.0	.0	.0	.1	.0	.0	.1
2. NW	*	.0	.0	.5	.0	.2	.0	.0	.1	.0	.0	.0	.0
3. SW	*	.0	.0	.4	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.9	.0	.0	.0	.0	.0	.1	.0	.0	.0
5. ES mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0	.0
6. WN mdblk	*	.0	.0	1.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.1	.0	.0	.0
9. SE mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.5	.0	.0	.7
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.7	.0	.0	.4
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	1.0	.0	.0	.5	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.2	1.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.4	.0	.0	1.6	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.5	.4	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 14th St NBA	*	4	-150	4	0	* AG	593	7.7	.0	10.0
B. 14th St NBD	*	4	0	4	150	* AG	593	5.4	.0	10.0
C. 14th St NBL	*	2	-150	0	0	* AG	0	5.1	.0	10.0
D. 14th St SBA	*	-4	150	-4	0	* AG	639	7.9	.0	10.0
E. 14th St SBD	*	-4	0	-4	-150	* AG	1391	5.7	.0	10.0
F. 14th St SBL	*	-2	150	0	0	* AG	0	5.1	.0	10.0
G. 13th St EBA	*	-150	-5	0	-5	* AG	752	11.6	.0	10.0
H. 13th St EBD	*	0	-5	150	-5	* AG	0	5.1	.0	10.0
I. 13th St EBL	*	-150	-2	0	0	* AG	0	5.1	.0	10.0
J. 13th St WBA	*	150	0	0	0	* AG	0	5.1	.0	10.0
K. 13th St WBD	*	0	0	-150	0	* AG	0	5.1	.0	10.0
L. 13th St WBL	*	150	2	0	0	* AG	0	5.1	.0	10.0
M. 14th St NBAX	*	4	-750	4	-150	* AG	593	5.1	.0	10.0
N. 14th St NBDX	*	4	150	4	750	* AG	593	5.1	.0	10.0
O. 14th St SBAX	*	-4	750	-4	150	* AG	639	5.1	.0	10.0
P. 14th St SBDX	*	-4	-150	-4	-750	* AG	1391	5.1	.0	10.0
Q. 13th St EBAX	*	-750	-5	-150	-5	* AG	752	5.1	.0	10.0
R. 13th St EBDX	*	150	-5	750	-5	* AG	0	5.1	.0	10.0
S. 13th St WBAX	*	750	0	150	0	* AG	0	5.1	.0	10.0

T. 13th St WBDX	*	-150	0	-750	0	* AG	0	5.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-12	1.8
2. NW	*	-10	7	1.8
3. SW	*	-10	-12	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-12	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-12	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	* 1.8	*	.3	.0	.0	.0	.3	.0	1.1	.0
2. NW	*	173.	* 2.0	*	.3	.0	.0	.0	1.0	.0	.4	.0
3. SW	*	8.	* 1.7	*	.0	.2	.0	.6	.2	.0	.6	.0
4. NE	*	187.	* 1.4	*	.6	.0	.0	.0	.4	.0	.0	.0
5. ES mdblk	*	271.	* .5	*	.0	.0	.0	.0	.0	.0	.2	.0
6. WN mdblk	*	104.	* .9	*	.0	.0	.0	.0	.1	.0	.7	.0
7. WS mdblk	*	81.	* 1.4	*	.0	.0	.0	.0	.0	.0	1.2	.0
8. EN mdblk	*	267.	* .5	*	.0	.0	.0	.0	.0	.0	.2	.0
9. SE mdblk	*	351.	* 1.4	*	.7	.0	.0	.0	.5	.0	.1	.0
10. NW mdblk	*	175.	* 1.3	*	.1	.2	.0	.7	.1	.0	.0	.0
11. SW mdblk	*	7.	* 1.6	*	.3	.0	.0	.0	1.0	.0	.0	.0
12. NE mdblk	*	187.	* 1.2	*	.0	.5	.0	.3	.1	.0	.0	.0
13. ES blk	*	270.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	* .5	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .7	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	268.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* 1.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* .9	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	* 1.4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* 1.0	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: ExistingPP-2 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.5	.0	.0	.6	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.3	.5	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.3	.0	.0	1.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.5	.3	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final
Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-01 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	7	-150	7	0	* AG	670	1.4	.0	10.0
B. Grand Av NBD	*	7	0	7	150	* AG	1091	1.1	.0	10.0
C. Grand Av NBL	*	5	-150	0	0	* AG	271	1.8	.0	10.0
D. Grand Av SBA	*	-5	150	-5	0	* AG	1000	1.4	.0	11.8
E. Grand Av SBD	*	-5	0	-5	-150	* AG	1491	1.1	.0	10.0
F. Grand Av SBL	*	-2	150	0	0	* AG	154	1.7	.0	10.0
G. Santa Cl EBA	*	-150	-4	0	-4	* AG	304	1.7	.0	10.0
H. Santa Cl EBD	*	0	-4	150	-4	* AG	362	1.2	.0	10.0
I. Santa Cl EBL	*	-150	-2	0	0	* AG	94	1.7	.0	10.0
J. Santa Cl WBA	*	150	9	0	9	* AG	1066	1.8	.0	13.5
K. Santa Cl WBD	*	0	9	-150	9	* AG	1133	1.7	.0	10.0
L. Santa Cl WBL	*	150	5	0	0	* AG	518	1.8	.0	10.0
M. Grand A NBAX	*	7	-750	7	-150	* AG	941	1.0	.0	10.0
N. Grand A NBDX	*	7	150	7	750	* AG	1091	1.0	.0	10.0
O. Grand A SBAX	*	-5	750	-5	150	* AG	1154	1.0	.0	11.8
P. Grand A SBDX	*	-5	-150	-5	-750	* AG	1491	1.0	.0	10.0
Q. Santa C EBAX	*	-750	-4	-150	-4	* AG	398	1.0	.0	10.0
R. Santa C EBDX	*	150	-4	750	-4	* AG	362	1.0	.0	10.0
S. Santa C WBAX	*	750	9	150	9	* AG	1584	1.0	.0	13.5
T. Santa C WBDX	*	-150	9	-750	9	* AG	1133	1.0	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-01 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-13	15	1.8
3. SW	*	-12	-10	1.8
4. NE	*	14	17	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	15	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	17	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-13	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	15	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	17	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-13	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-01 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	352.	.5	*	.0	.1	.0	.0	.0	.0	.0	.0
2. NW	*	97.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	80.	.5	*	.0	.0	.0	.0	.1	.0	.0	.0
4. NE	*	188.	.5	*	.1	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	279.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	97.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	83.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	262.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	353.	.4	*	.1	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	7.	.4	*	.0	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	187.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-01 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
17. SE blk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-02 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	5	-150	5	0	* AG	1156	1.4	.0	13.5
B. Grand Av NBD	*	5	0	5	150	* AG	781	1.1	.0	10.0
C. Grand Av NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Grand Av SBA	*	-7	150	-7	0	* AG	844	1.4	.0	10.0
E. Grand Av SBD	*	-7	0	-7	-150	* AG	1190	1.1	.0	10.0
F. Grand Av SBL	*	-5	150	0	0	* AG	712	1.8	.0	10.0
G. MacArthu EBA	*	-150	-4	0	-4	* AG	1454	1.8	.0	11.8
H. MacArthu EBD	*	0	-4	150	-4	* AG	2457	1.8	.0	10.0
I. MacArthu EBL	*	-150	-2	0	0	* AG	262	1.8	.0	10.0
J. MacArthu WBA	*	150	0	0	0	* AG	0	1.0	.0	10.0
K. MacArthu WBD	*	0	0	-150	0	* AG	0	1.0	.0	10.0
L. MacArthu WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Grand A NBAX	*	5	-750	5	-150	* AG	1156	1.0	.0	13.5
N. Grand A NBDX	*	5	150	5	750	* AG	781	1.0	.0	10.0
O. Grand A SBAX	*	-7	750	-7	150	* AG	1556	1.0	.0	10.0
P. Grand A SBDX	*	-7	-150	-7	-750	* AG	1190	1.0	.0	10.0
Q. MacArth EBAX	*	-750	-4	-150	-4	* AG	1716	1.0	.0	11.8
R. MacArth EBDX	*	150	-4	750	-4	* AG	2457	1.0	.0	10.0
S. MacArth WBAX	*	750	0	150	0	* AG	0	1.0	.0	10.0

T. MacArth WBDX	*	-150	0	-750	0	* AG	0	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-02 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-11	1.8
4. NE	*	12	7	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-11	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-11	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-02 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	279.	.6	*	.0	.0	.0	.0	.0	.0	.3	.1
2. NW	*	101.	.6	*	.0	.0	.0	.0	.0	.0	.0	.3
3. SW	*	81.	.6	*	.0	.0	.0	.0	.0	.0	.0	.4
4. NE	*	187.	.6	*	.2	.0	.0	.0	.0	.0	.0	.2
5. ES mdblk	*	278.	.6	*	.0	.0	.0	.0	.0	.0	.0	.5
6. WN mdblk	*	97.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
7. WS mdblk	*	83.	.5	*	.0	.0	.0	.0	.0	.0	.3	.0
8. EN mdblk	*	260.	.4	*	.0	.0	.0	.0	.0	.0	.0	.3
9. SE mdblk	*	353.	.4	*	.2	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	171.	.5	*	.0	.0	.0	.2	.0	.1	.0	.0
11. SW mdblk	*	7.	.4	*	.0	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	187.	.4	*	.0	.1	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-02 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-03 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Grand Av NBA	*	4	-150	4	0	* AG	1562	1.6	.0	10.0
B. Grand Av NBD	*	4	0	4	150	* AG	1229	1.1	.0	10.0
C. Grand Av NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Grand Av SBA	*	-7	150	-7	0	* AG	1119	1.4	.0	10.0
E. Grand Av SBD	*	-7	0	-7	-150	* AG	1326	1.1	.0	10.0
F. Grand Av SBL	*	-5	150	0	0	* AG	213	1.8	.0	10.0
G. El Embar EBA	*	-150	0	0	0	* AG	0	1.1	.0	10.0
H. El Embar EBD	*	0	0	150	0	* AG	679	1.7	.0	10.0
I. El Embar EBL	*	-150	-2	0	0	* AG	0	1.1	.0	10.0
J. El Embar WBA	*	150	0	0	0	* AG	133	1.6	.0	10.0
K. El Embar WBD	*	0	0	-150	0	* AG	0	1.1	.0	10.0
L. El Embar WBL	*	150	2	0	0	* AG	207	1.8	.0	10.0
M. Grand A NBAX	*	4	-750	4	-150	* AG	1562	1.0	.0	10.0
N. Grand A NBDX	*	4	150	4	750	* AG	1229	1.0	.0	10.0
O. Grand A SBAX	*	-7	750	-7	150	* AG	1332	1.0	.0	10.0
P. Grand A SBDX	*	-7	-150	-7	-750	* AG	1326	1.0	.0	10.0
Q. El Emba EBAX	*	-750	0	-150	0	* AG	0	1.1	.0	10.0
R. El Emba EBDX	*	150	0	750	0	* AG	679	1.1	.0	10.0
S. El Emba WBAX	*	750	0	150	0	* AG	340	1.1	.0	10.0

T. El Emba WBDX	*	-150	0	-750	0	* AG	0	1.1	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-03 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-7	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-7	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-03 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	352.	.5	*	.0	.2	.0	.0	.0	.0	.0	.0
2. NW	*	96.	.4	*	.0	.0	.0	.0	.0	.0	.0	.1
3. SW	*	84.	.4	*	.0	.0	.0	.0	.0	.0	.0	.1
4. NE	*	188.	.6	*	.3	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	279.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	91.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	89.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	261.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
9. SE mdblk	*	353.	.5	*	.3	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	172.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	8.	.4	*	.1	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	187.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	91.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	90.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-03 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-04 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	7	-150	7	0	* AG	441	1.4	.0	10.0
B. Lakeshor NBD	*	7	0	7	150	* AG	799	1.1	.0	10.0
C. Lakeshor NBL	*	5	-150	0	0	* AG	63	1.7	.0	10.0
D. Lakeshor SBA	*	-4	150	-4	0	* AG	472	1.4	.0	10.0
E. Lakeshor SBD	*	-4	0	-4	-150	* AG	871	1.1	.0	10.0
F. Lakeshor SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. Lake Par EBA	*	-150	-4	0	-4	* AG	368	1.7	.0	10.0
H. Lake Par EBD	*	0	-4	150	-4	* AG	0	1.0	.0	10.0
I. Lake Par EBL	*	-150	-5	0	0	* AG	106	1.7	.0	10.0
J. Lake Par WBA	*	150	5	0	5	* AG	1671	1.8	.0	11.8
K. Lake Par WBD	*	0	5	-150	5	* AG	1694	1.8	.0	10.0
L. Lake Par WBL	*	150	2	0	0	* AG	243	1.8	.0	10.0
M. Lakesho NBAX	*	7	-750	7	-150	* AG	504	1.0	.0	10.0
N. Lakesho NBDX	*	7	150	7	750	* AG	799	1.0	.0	10.0
O. Lakesho SBAX	*	-4	750	-4	150	* AG	472	1.0	.0	10.0
P. Lakesho SBDX	*	-4	-150	-4	-750	* AG	871	1.0	.0	10.0
Q. Lake Pa EBAX	*	-750	-4	-150	-4	* AG	474	1.0	.0	10.0
R. Lake Pa EBDX	*	150	-4	750	-4	* AG	0	1.0	.0	10.0
S. Lake Pa WBAX	*	750	5	150	5	* AG	1914	1.0	.0	11.8
T. Lake Pa WBDX	*	-150	5	-750	5	* AG	1694	1.0	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-04 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-10	1.8
2. NW	*	-10	12	1.8
3. SW	*	-10	-10	1.8
4. NE	*	14	13	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	12	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	13	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	12	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	13	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-04 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	278.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	98.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	79.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	261.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	278.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	98.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	82.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	263.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	353.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	7.	.3	*	.0	.0	.0	.0	.1	.0	.0	.0
12. NE mdblk	*	187.	.3	*	.0	.1	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	83.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-04 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-05 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	4	-150	4	0	* AG	706	1.4	.0	10.0
B. Lakeshor NBD	*	4	0	4	150	* AG	504	1.0	.0	10.0
C. Lakeshor NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Lakeshor SBA	*	-7	150	-7	0	* AG	307	1.3	.0	10.0
E. Lakeshor SBD	*	-7	0	-7	-150	* AG	475	1.0	.0	10.0
F. Lakeshor SBL	*	-5	150	0	0	* AG	575	1.8	.0	10.0
G. MacArthu EBA	*	-150	-7	0	-7	* AG	2112	1.8	.0	11.8
H. MacArthu EBD	*	0	-7	150	-7	* AG	3019	1.8	.0	10.0
I. MacArthu EBL	*	-150	-5	0	0	* AG	298	1.7	.0	10.0
J. MacArthu WBA	*	150	0	0	0	* AG	0	1.0	.0	10.0
K. MacArthu WBD	*	0	0	-150	0	* AG	0	1.0	.0	10.0
L. MacArthu WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Lakesho NBAX	*	4	-750	4	-150	* AG	706	1.0	.0	10.0
N. Lakesho NBDX	*	4	150	4	750	* AG	504	1.0	.0	10.0
O. Lakesho SBAX	*	-7	750	-7	150	* AG	882	1.0	.0	10.0
P. Lakesho SBDX	*	-7	-150	-7	-750	* AG	475	1.0	.0	10.0
Q. MacArth EBAX	*	-750	-7	-150	-7	* AG	2410	1.0	.0	11.8
R. MacArth EBDX	*	150	-7	750	-7	* AG	3019	1.0	.0	10.0
S. MacArth WBAX	*	750	0	150	0	* AG	0	1.0	.0	10.0

T. MacArth WBDX	*	-150	0	-750	0	* AG	0	1.0	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-05 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-14	1.8
2. NW	*	-14	7	1.8
3. SW	*	-14	-14	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-14	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-14	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-05 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	279.	.7	*	.0	.0	.0	.0	.0	.0	.4	.0
2. NW	*	101.	.4	*	.0	.0	.0	.0	.0	.0	.0	.3
3. SW	*	81.	.7	*	.0	.0	.0	.0	.0	.0	.0	.5
4. NE	*	260.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
5. ES mdblk	*	278.	.7	*	.0	.0	.0	.0	.0	.0	.0	.6
6. WN mdblk	*	98.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
7. WS mdblk	*	82.	.6	*	.0	.0	.0	.0	.0	.0	.5	.0
8. EN mdblk	*	260.	.4	*	.0	.0	.0	.0	.0	.0	.0	.3
9. SE mdblk	*	354.	.3	*	.1	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	171.	.3	*	.0	.0	.0	.0	.0	.1	.0	.0
11. SW mdblk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	188.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-05 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
17. SE blk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-06 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S	Z0= 100. CM	ALT= 6. (M)
BRG= WORST CASE	VD= .0 CM/S	
CLAS= 7 (G)	VS= .0 CM/S	
MIXH= 1000. M	AMB= .0 PPM	
SIGTH= 10. DEGREES	TEMP= 10.0 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeshor NBA	*	4	-150	4	0	* AG	1168	1.4	.0	10.0
B. Lakeshor NBD	*	4	0	4	150	* AG	597	1.0	.0	10.0
C. Lakeshor NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Lakeshor SBA	*	-7	150	-7	0	* AG	611	1.4	.0	10.0
E. Lakeshor SBD	*	-7	0	-7	-150	* AG	1100	1.1	.0	10.0
F. Lakeshor SBL	*	-5	150	0	0	* AG	103	1.7	.0	10.0
G. E. 18th EBA	*	-150	0	0	0	* AG	0	1.0	.0	10.0
H. E. 18th EBD	*	0	0	150	0	* AG	725	1.8	.0	10.0
I. E. 18th EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. E. 18th WBA	*	150	4	0	4	* AG	51	1.6	.0	10.0
K. E. 18th WBD	*	0	4	-150	4	* AG	0	1.0	.0	10.0
L. E. 18th WBL	*	150	5	0	0	* AG	489	1.8	.0	10.0
M. Lakesho NBAX	*	4	-750	4	-150	* AG	1168	1.0	.0	10.0
N. Lakesho NBDX	*	4	150	4	750	* AG	597	1.0	.0	10.0
O. Lakesho SBAX	*	-7	750	-7	150	* AG	714	1.0	.0	10.0
P. Lakesho SBDX	*	-7	-150	-7	-750	* AG	1100	1.0	.0	10.0
Q. E. 18th EBAX	*	-750	0	-150	0	* AG	0	1.0	.0	10.0
R. E. 18th EBDX	*	150	0	750	0	* AG	725	1.0	.0	10.0
S. E. 18th WBAX	*	750	4	150	4	* AG	540	1.0	.0	10.0

T. E. 18th WBDX	*	-150	4	-750	4	* AG	0	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-06 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-7	1.8
2. NW	*	-14	10	1.8
3. SW	*	-14	-7	1.8
4. NE	*	10	10	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-06 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	82.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
2. NW	*	98.	.3	*	.0	.0	.0	.0	.0	.0	.0	.1
3. SW	*	84.	.4	*	.0	.0	.0	.0	.0	.0	.0	.2
4. NE	*	187.	.4	*	.2	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	280.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	92.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	89.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	260.	.3	*	.0	.0	.0	.0	.0	.0	.0	.1
9. SE mdblk	*	352.	.3	*	.2	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	.3	*	.0	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	9.	.3	*	.0	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	185.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	91.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	90.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-06 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-07 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 1st Ave NBA	*	7	-150	7	0	* AG	2212	1.7	.0	17.0
B. 1st Ave NBD	*	7	0	7	150	* AG	1664	1.2	.0	10.0
C. 1st Ave NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. 1st Ave SBA	*	-4	150	-4	0	* AG	1016	1.4	.0	10.0
E. 1st Ave SBD	*	-4	0	-4	-150	* AG	1330	1.1	.0	10.0
F. 1st Ave SBL	*	-2	150	0	0	* AG	10	1.7	.0	10.0
G. Internat EBA	*	-150	0	0	0	* AG	0	1.0	.0	10.0
H. Internat EBD	*	0	0	150	0	* AG	636	1.7	.0	10.0
I. Internat EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. Internat WBA	*	150	4	0	4	* AG	78	1.6	.0	10.0
K. Internat WBD	*	0	4	-150	4	* AG	0	1.0	.0	10.0
L. Internat WBL	*	150	5	0	0	* AG	314	1.7	.0	10.0
M. 1st Ave NBAX	*	7	-750	7	-150	* AG	2212	1.0	.0	17.0
N. 1st Ave NBDX	*	7	150	7	750	* AG	1664	1.0	.0	10.0
O. 1st Ave SBAX	*	-4	750	-4	150	* AG	1026	1.0	.0	10.0
P. 1st Ave SBDX	*	-4	-150	-4	-750	* AG	1330	1.0	.0	10.0
Q. Interna EBAX	*	-750	0	-150	0	* AG	0	1.0	.0	10.0
R. Interna EBDX	*	150	0	750	0	* AG	636	1.0	.0	10.0
S. Interna WBAX	*	750	4	150	4	* AG	392	1.0	.0	10.0
T. Interna WBDX	*	-150	4	-750	4	* AG	0	1.0	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-07 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	17	-7	1.8
2. NW	*	-10	10	1.8
3. SW	*	-10	-7	1.8
4. NE	*	14	10	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	17	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	17	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-07 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	188.	.5	*	.4	.0	.0	.0	.0	.0	.0	.0
2. NW	*	171.	.5	*	.2	.0	.0	.0	.2	.0	.0	.0
3. SW	*	84.	.5	*	.2	.0	.0	.0	.0	.0	.0	.1
4. NE	*	185.	.7	*	.4	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	279.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	93.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	89.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	260.	.3	*	.0	.0	.0	.0	.0	.0	.0	.1
9. SE mdblk	*	352.	.5	*	.4	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	10.	.5	*	.2	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	186.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	93.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	91.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-07 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.1	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.2	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-08 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 12th St NBA	*	7	-150	7	0	* AG	3386	1.7	.0	10.0
B. 12th St NBD	*	7	0	7	150	* AG	2238	1.1	.0	10.0
C. 12th St NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. 12th St SBA	*	-9	150	-9	0	* AG	1288	1.4	.0	10.0
E. 12th St SBD	*	-9	0	-9	-150	* AG	1468	1.1	.0	10.0
F. 12th St SBL	*	-5	150	0	0	* AG	5	1.7	.0	10.0
G. E. 12th EBA	*	-150	-2	0	-2	* AG	40	1.6	.0	10.0
H. E. 12th EBD	*	0	-2	150	-2	* AG	1199	1.8	.0	10.0
I. E. 12th EBL	*	-150	-2	0	0	* AG	20	1.7	.0	10.0
J. E. 12th WBA	*	150	4	0	4	* AG	6	1.6	.0	10.0
K. E. 12th WBD	*	0	4	-150	4	* AG	5	1.1	.0	10.0
L. E. 12th WBL	*	150	5	0	0	* AG	165	1.7	.0	10.0
M. 12th St NBAX	*	7	-750	7	-150	* AG	3386	1.0	.0	10.0
N. 12th St NBDX	*	7	150	7	750	* AG	2238	1.0	.0	10.0
O. 12th St SBAX	*	-9	750	-9	150	* AG	1293	1.0	.0	10.0
P. 12th St SBDX	*	-9	-150	-9	-750	* AG	1468	1.0	.0	10.0
Q. E. 12th EBAX	*	-750	-2	-150	-2	* AG	60	1.0	.0	10.0
R. E. 12th EBDX	*	150	-2	750	-2	* AG	1199	1.0	.0	10.0
S. E. 12th WBAX	*	750	4	150	4	* AG	171	1.0	.0	10.0
T. E. 12th WBDX	*	-150	4	-750	4	* AG	5	1.0	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-08 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-8	1.8
2. NW	*	-15	10	1.8
3. SW	*	-15	-8	1.8
4. NE	*	14	10	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-15	150	1.8
11. SW mdblk	*	-15	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-15	600	1.8
19. SW blk	*	-15	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-08 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	189.	.8	*	.7	.0	.0	.0	.0	.0	.0	.0
2. NW	*	168.	.5	*	.2	.0	.0	.0	.2	.0	.0	.0
3. SW	*	84.	.6	*	.2	.0	.0	.0	.1	.0	.0	.2
4. NE	*	188.	.9	*	.6	.0	.0	.0	.0	.0	.0	.1
5. ES mdblk	*	279.	.4	*	.0	.0	.0	.0	.0	.0	.0	.3
6. WN mdblk	*	94.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	88.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	258.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
9. SE mdblk	*	351.	.8	*	.7	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	172.	.5	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	13.	.5	*	.2	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	186.	.5	*	.0	.3	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	93.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	89.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	8.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-08 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.2	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-09 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 2nd Ave NBA	*	2	-150	2	0	* AG	243	1.5	.0	10.0
B. 2nd Ave NBD	*	2	0	2	150	* AG	258	1.1	.0	10.0
C. 2nd Ave NBL	*	2	-150	0	0	* AG	0	1.1	.0	10.0
D. 2nd Ave SBA	*	-2	150	-2	0	* AG	35	1.5	.0	10.0
E. 2nd Ave SBD	*	-2	0	-2	-150	* AG	68	1.1	.0	10.0
F. 2nd Ave SBL	*	-2	150	0	0	* AG	10	1.7	.0	10.0
G. E. 15th EBA	*	-150	-2	0	-2	* AG	564	1.5	.0	10.0
H. E. 15th EBD	*	0	-2	150	-2	* AG	557	1.1	.0	10.0
I. E. 15th EBL	*	-150	-2	0	0	* AG	31	1.7	.0	10.0
J. E. 15th WBA	*	150	0	0	0	* AG	0	1.1	.0	10.0
K. E. 15th WBD	*	0	0	-150	0	* AG	0	1.1	.0	10.0
L. E. 15th WBL	*	150	2	0	0	* AG	0	1.1	.0	10.0
M. 2nd Ave NBAX	*	2	-750	2	-150	* AG	243	1.1	.0	10.0
N. 2nd Ave NBDX	*	2	150	2	750	* AG	258	1.1	.0	10.0
O. 2nd Ave SBAX	*	-2	750	-2	150	* AG	45	1.1	.0	10.0
P. 2nd Ave SBDX	*	-2	-150	-2	-750	* AG	68	1.1	.0	10.0
Q. E. 15th EBAX	*	-750	-2	-150	-2	* AG	595	1.1	.0	10.0
R. E. 15th EBDX	*	150	-2	750	-2	* AG	557	1.1	.0	10.0
S. E. 15th WBAX	*	750	0	150	0	* AG	0	1.1	.0	10.0

T. E. 15th WBDX	*	-150	0	-750	0	* AG	0	1.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-09 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-8	1.8
2. NW	*	-8	8	1.8
3. SW	*	-8	-8	1.8
4. NE	*	8	8	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-09 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	* .2	*	.0	.0	.0	.0	.0	.0	.1	.0
2. NW	*	262.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	277.	* .1	*	.0	.0	.0	.0	.0	.0	.1	.0
4. NE	*	263.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	275.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	98.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	83.	* .2	*	.0	.0	.0	.0	.0	.0	.1	.0
8. EN mdblk	*	264.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	354.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	175.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	6.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	186.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	355.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	175.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	5.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	185.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-09 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-10 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 5th Ave NBA	*	2	-150	2	0	* AG	515	1.8	.0	10.0
B. 5th Ave NBD	*	2	0	2	150	* AG	514	1.7	.0	10.0
C. 5th Ave NBL	*	2	-150	0	0	* AG	72	1.7	.0	10.0
D. 5th Ave SBA	*	-2	150	-2	0	* AG	390	1.7	.0	10.0
E. 5th Ave SBD	*	-2	0	-2	-150	* AG	551	1.7	.0	10.0
F. 5th Ave SBL	*	-2	150	0	0	* AG	60	1.7	.0	10.0
G. E. 12th EBA	*	-150	-2	0	-2	* AG	951	1.4	.0	13.5
H. E. 12th EBD	*	0	-2	150	-2	* AG	964	1.1	.0	11.8
I. E. 12th EBL	*	-150	-2	0	0	* AG	42	1.7	.0	10.0
J. E. 12th WBA	*	150	2	0	2	* AG	506	1.4	.0	13.5
K. E. 12th WBD	*	0	2	-150	2	* AG	544	1.0	.0	11.8
L. E. 12th WBL	*	150	2	0	0	* AG	37	1.7	.0	10.0
M. 5th Ave NBAX	*	2	-750	2	-150	* AG	587	1.1	.0	10.0
N. 5th Ave NBDX	*	2	150	2	750	* AG	514	1.1	.0	10.0
O. 5th Ave SBAX	*	-2	750	-2	150	* AG	450	1.1	.0	10.0
P. 5th Ave SBDX	*	-2	-150	-2	-750	* AG	551	1.1	.0	10.0
Q. E. 12th EBAX	*	-750	-2	-150	-2	* AG	993	1.0	.0	13.5
R. E. 12th EBDX	*	150	-2	750	-2	* AG	964	1.0	.0	11.8
S. E. 12th WBAX	*	750	2	150	2	* AG	543	1.0	.0	13.5
T. E. 12th WBDX	*	-150	2	-750	2	* AG	544	1.0	.0	11.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-10 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-9	1.8
2. NW	*	-8	9	1.8
3. SW	*	-8	-10	1.8
4. NE	*	8	10	1.8
5. ES mdblk	*	150	-9	1.8
6. WN mdblk	*	-150	9	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-9	1.8
14. WN blk	*	-600	9	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-10 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
2. NW	*	172.	.4	*	.0	.0	.0	.0	.1	.0	.0	.0
3. SW	*	82.	.4	*	.0	.0	.0	.0	.0	.0	.0	.1
4. NE	*	188.	.4	*	.1	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	276.	.3	*	.0	.0	.0	.0	.0	.0	.0	.1
6. WN mdblk	*	97.	.3	*	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	84.	.3	*	.0	.0	.0	.0	.0	.0	.2	.0
8. EN mdblk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	353.	.3	*	.1	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	7.	.3	*	.0	.0	.0	.0	.1	.0	.0	.0
12. NE mdblk	*	186.	.3	*	.0	.1	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-10 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-11 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 5th Ave NBA	*	4	-150	4	0	* AG	465	1.8	.0	10.0
B. 5th Ave NBD	*	4	0	4	150	* AG	778	1.8	.0	10.0
C. 5th Ave NBL	*	2	-150	0	0	* AG	60	1.7	.0	10.0
D. 5th Ave SBA	*	-2	150	-2	0	* AG	473	1.8	.0	10.0
E. 5th Ave SBD	*	-2	0	-2	-150	* AG	796	1.8	.0	10.0
F. 5th Ave SBL	*	-2	150	0	0	* AG	74	1.7	.0	10.0
G. E. 8th S EBA	*	-150	-9	0	-9	* AG	1975	1.5	.0	10.0
H. E. 8th S EBD	*	0	-9	150	-9	* AG	1880	1.1	.0	10.0
I. E. 8th S EBL	*	-150	-5	0	0	* AG	318	1.8	.0	10.0
J. E. 8th S WBA	*	150	9	0	9	* AG	451	1.3	.0	10.0
K. E. 8th S WBD	*	0	9	-150	9	* AG	486	1.0	.0	10.0
L. E. 8th S WBL	*	150	5	0	0	* AG	124	1.7	.0	10.0
M. 5th Ave NBAX	*	4	-750	4	-150	* AG	525	1.0	.0	10.0
N. 5th Ave NBDX	*	4	150	4	750	* AG	778	1.0	.0	10.0
O. 5th Ave SBAX	*	-2	750	-2	150	* AG	547	1.0	.0	10.0
P. 5th Ave SBDX	*	-2	-150	-2	-750	* AG	796	1.0	.0	10.0
Q. E. 8th EBAX	*	-750	-9	-150	-9	* AG	2293	1.0	.0	10.0
R. E. 8th EBDX	*	150	-9	750	-9	* AG	1880	1.0	.0	10.0
S. E. 8th WBAX	*	750	9	150	9	* AG	575	1.0	.0	10.0

T. E. 8th WBDX	*	-150	9	-750	9	* AG	486	1.0	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-11 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-15	1.8
2. NW	*	-8	15	1.8
3. SW	*	-8	-15	1.8
4. NE	*	10	15	1.8
5. ES mdblk	*	150	-15	1.8
6. WN mdblk	*	-150	15	1.8
7. WS mdblk	*	-150	-15	1.8
8. EN mdblk	*	150	15	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-15	1.8
14. WN blk	*	-600	15	1.8
15. WS blk	*	-600	-15	1.8
16. EN blk	*	600	15	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-11 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	278.	.6	*	.0	.0	.0	.0	.0	.3	.0	
2. NW	*	173.	.4	*	.0	.0	.0	.0	.2	.0	.0	.0
3. SW	*	9.	.5	*	.0	.1	.0	.0	.0	.2	.0	.0
4. NE	*	189.	.4	*	.0	.0	.0	.0	.1	.0	.0	.0
5. ES mdblk	*	277.	.4	*	.0	.0	.0	.0	.0	.0	.0	.3
6. WN mdblk	*	100.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	82.	.5	*	.0	.0	.0	.0	.0	.0	.4	.0
8. EN mdblk	*	262.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	353.	.3	*	.1	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	.3	*	.0	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	7.	.4	*	.0	.0	.0	.0	.2	.0	.0	.0
12. NE mdblk	*	187.	.4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	83.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-11 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final
Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-12 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 5th Ave NBA	*	2	-150	2	0	* AG	192	1.5	.0	10.0
B. 5th Ave NBD	*	2	0	2	150	* AG	499	1.2	.0	10.0
C. 5th Ave NBL	*	2	-150	0	0	* AG	326	1.8	.0	10.0
D. 5th Ave SBA	*	-4	150	-4	0	* AG	790	1.7	.0	10.0
E. 5th Ave SBD	*	-4	0	-4	-150	* AG	1244	1.6	.0	10.0
F. 5th Ave SBL	*	-2	150	0	0	* AG	73	1.7	.0	10.0
G. Embarcad EBA	*	-150	-2	0	-2	* AG	453	1.5	.0	10.0
H. Embarcad EBD	*	0	-2	150	-2	* AG	277	1.1	.0	10.0
I. Embarcad EBL	*	-150	-2	0	0	* AG	340	1.8	.0	10.0
J. Embarcad WBA	*	150	4	0	4	* AG	362	1.5	.0	10.0
K. Embarcad WBD	*	0	4	-150	4	* AG	984	1.6	.0	10.0
L. Embarcad WBL	*	150	2	0	0	* AG	468	1.8	.0	10.0
M. 5th Ave NBAX	*	2	-750	2	-150	* AG	518	1.1	.0	10.0
N. 5th Ave NBDX	*	2	150	2	750	* AG	499	1.1	.0	10.0
O. 5th Ave SBAX	*	-4	750	-4	150	* AG	863	1.1	.0	10.0
P. 5th Ave SBDX	*	-4	-150	-4	-750	* AG	1244	1.1	.0	10.0
Q. Embarca EBAX	*	-750	-2	-150	-2	* AG	793	1.1	.0	10.0
R. Embarca EBDX	*	150	-2	750	-2	* AG	277	1.1	.0	10.0
S. Embarca WBAX	*	750	4	150	4	* AG	830	1.1	.0	10.0
T. Embarca WBDX	*	-150	4	-750	4	* AG	984	1.1	.0	10.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-12 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-8	1.8
2. NW	*	-10	10	1.8
3. SW	*	-10	-8	1.8
4. NE	*	8	10	1.8
5. ES mdblk	*	150	-8	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-8	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-8	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-8	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-12 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	172.	.6	*	.0	.0	.0	.0	.2	.0	.0	.0
3. SW	*	8.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
4. NE	*	263.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	276.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	98.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	82.	.4	*	.0	.0	.0	.0	.0	.0	.1	.0
8. EN mdblk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	.4	*	.0	.0	.0	.0	.1	.0	.0	.0
10. NW mdblk	*	174.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	7.	.4	*	.0	.0	.0	.0	.3	.0	.0	.0
12. NE mdblk	*	186.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-12 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-13 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Harrison NBA	*	7	-150	7	0	* AG	1431	1.7	.0	15.3
B. Harrison NBD	*	7	0	7	150	* AG	1753	1.5	.0	11.8
C. Harrison NBL	*	5	-150	0	0	* AG	253	1.7	.0	10.0
D. Harrison SBA	*	-7	150	-7	0	* AG	720	1.5	.0	11.8
E. Harrison SBD	*	-7	0	-7	-150	* AG	691	1.1	.0	10.0
F. Harrison SBL	*	-5	150	0	0	* AG	180	1.7	.0	10.0
G. 27th St EBA	*	-150	-5	0	-5	* AG	402	1.4	.0	10.0
H. 27th St EBD	*	0	-5	150	-5	* AG	575	1.1	.0	10.0
I. 27th St EBL	*	-150	-5	0	0	* AG	196	1.7	.0	10.0
J. 27th St WBA	*	150	2	0	2	* AG	325	1.4	.0	10.0
K. 27th St WBD	*	0	2	-150	2	* AG	526	1.1	.0	10.0
L. 27th St WBL	*	150	2	0	0	* AG	38	1.7	.0	10.0
M. Harriso NBAX	*	7	-750	7	-150	* AG	1684	1.0	.0	15.3
N. Harriso NBDX	*	7	150	7	750	* AG	1753	1.0	.0	11.8
O. Harriso SBAX	*	-7	750	-7	150	* AG	900	1.0	.0	11.8
P. Harriso SBDX	*	-7	-150	-7	-750	* AG	691	1.0	.0	10.0
Q. 27th St EBAX	*	-750	-5	-150	-5	* AG	598	1.0	.0	10.0
R. 27th St EBDX	*	150	-5	750	-5	* AG	575	1.0	.0	10.0
S. 27th St WBAX	*	750	2	150	2	* AG	363	1.0	.0	10.0

T. 27th St WBDX	*	-150	2	-750	2	* AG	526	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-13 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	16	-12	1.8
2. NW	*	-14	8	1.8
3. SW	*	-14	-12	1.8
4. NE	*	14	8	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-12	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	16	-150	1.8
10. NW mdblk	*	-14	150	1.8
11. SW mdblk	*	-14	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-12	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	16	-600	1.8
18. NW blk	*	-14	600	1.8
19. SW blk	*	-14	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-13 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	350.	.5	*	.0	.2	.0	.0	.0	.0	.0	.0
2. NW	*	170.	.4	*	.1	.0	.0	.0	.0	.0	.0	.0
3. SW	*	9.	.4	*	.0	.0	.1	.0	.0	.0	.0	.0
4. NE	*	187.	.5	*	.3	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	97.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	83.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	.5	*	.3	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	172.	.4	*	.0	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	8.	.3	*	.0	.0	.0	.0	.1	.0	.0	.0
12. NE mdblk	*	188.	.5	*	.0	.3	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-13 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-14 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Harrison NBA	*	7	-150	7	0	* AG	2221	1.6	.0	10.0
B. Harrison NBD	*	7	0	7	150	* AG	1863	1.1	.0	10.0
C. Harrison NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Harrison SBA	*	-4	150	-4	0	* AG	745	1.4	.0	10.0
E. Harrison SBD	*	-4	0	-4	-150	* AG	959	1.1	.0	10.0
F. Harrison SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. Grand Av EBA	*	-150	-11	0	-11	* AG	886	1.8	.0	10.0
H. Grand Av EBD	*	0	-11	150	-11	* AG	1516	1.8	.0	10.0
I. Grand Av EBL	*	-150	-9	0	0	* AG	383	1.7	.0	10.0
J. Grand Av WBA	*	150	11	0	11	* AG	571	1.6	.0	10.0
K. Grand Av WBD	*	0	11	-150	11	* AG	737	1.2	.0	10.0
L. Grand Av WBL	*	150	9	0	0	* AG	269	1.7	.0	10.0
M. Harriso NBAX	*	7	-750	7	-150	* AG	2221	1.0	.0	10.0
N. Harriso NBDX	*	7	150	7	750	* AG	1863	1.0	.0	10.0
O. Harriso SBAX	*	-4	750	-4	150	* AG	745	1.0	.0	10.0
P. Harriso SBDX	*	-4	-150	-4	-750	* AG	959	1.0	.0	10.0
Q. Grand A EBAX	*	-750	-11	-150	-11	* AG	1269	1.0	.0	10.0
R. Grand A EBDX	*	150	-11	750	-11	* AG	1516	1.0	.0	10.0
S. Grand A WBAX	*	750	11	150	11	* AG	840	1.0	.0	10.0

T. Grand A WBDX	*	-150	11	-750	11	* AG	737	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-14 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	14	-17	1.8
2. NW	*	-10	17	1.8
3. SW	*	-10	-17	1.8
4. NE	*	14	17	1.8
5. ES mdblk	*	150	-17	1.8
6. WN mdblk	*	-150	17	1.8
7. WS mdblk	*	-150	-17	1.8
8. EN mdblk	*	150	17	1.8
9. SE mdblk	*	14	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	14	150	1.8
13. ES blk	*	600	-17	1.8
14. WN blk	*	-600	17	1.8
15. WS blk	*	-600	-17	1.8
16. EN blk	*	600	17	1.8
17. SE blk	*	14	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	14	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-14 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	350.	* .6	*	.1	.2	.0	.0	.0	.0	.0	.2
2. NW	*	171.	* .5	*	.2	.0	.0	.0	.1	.0	.0	.0
3. SW	*	81.	* .6	*	.1	.0	.0	.0	.0	.0	.0	.3
4. NE	*	188.	* .7	*	.3	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	278.	* .5	*	.0	.0	.0	.0	.0	.0	.0	.4
6. WN mdblk	*	98.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	82.	* .4	*	.0	.0	.0	.0	.0	.0	.2	.0
8. EN mdblk	*	260.	* .4	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	* .6	*	.4	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	* .4	*	.0	.0	.0	.1	.0	.0	.0	.0
11. SW mdblk	*	9.	* .4	*	.1	.0	.0	.0	.1	.0	.0	.0
12. NE mdblk	*	187.	* .4	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* .4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	173.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	* .4	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-14 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
17. SE blk	*	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-15 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Lakeside NBA	*	2	-150	2	0	* AG	712	1.6	.0	11.8
B. Lakeside NBD	*	2	0	2	150	* AG	957	1.4	.0	10.0
C. Lakeside NBL	*	2	-150	0	0	* AG	14	1.7	.0	10.0
D. Lakeside SBA	*	-2	150	-2	0	* AG	703	1.6	.0	10.0
E. Lakeside SBD	*	-2	0	-2	-150	* AG	636	1.1	.0	10.0
F. Lakeside SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. Jackson EBA	*	-150	0	0	0	* AG	32	1.6	.0	10.0
H. Jackson EBD	*	0	0	150	0	* AG	0	1.1	.0	10.0
I. Jackson EBL	*	-150	-2	0	0	* AG	245	1.8	.0	10.0
J. Jackson WBA	*	150	0	0	0	* AG	0	1.1	.0	10.0
K. Jackson WBD	*	0	0	-150	0	* AG	113	1.2	.0	10.0
L. Jackson WBL	*	150	2	0	0	* AG	0	1.1	.0	10.0
M. Lakesid NBAX	*	2	-750	2	-150	* AG	726	1.0	.0	11.8
N. Lakesid NBDX	*	2	150	2	750	* AG	957	1.0	.0	10.0
O. Lakesid SBAX	*	-2	750	-2	150	* AG	703	1.0	.0	10.0
P. Lakesid SBDX	*	-2	-150	-2	-750	* AG	636	1.0	.0	10.0
Q. Jackson EBAX	*	-750	0	-150	0	* AG	277	1.1	.0	10.0
R. Jackson EBDX	*	150	0	750	0	* AG	0	1.1	.0	10.0
S. Jackson WBAX	*	750	0	150	0	* AG	0	1.1	.0	10.0

T. Jackson WBDX	*	-150	0	-750	0	* AG	113	1.1	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-15 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	9	-7	1.8
2. NW	*	-8	7	1.8
3. SW	*	-8	-7	1.8
4. NE	*	8	7	1.8
5. ES mdblk	*	150	-7	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-7	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	9	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-7	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-7	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	9	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-15 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	352.	.3	*	.0	.2	.0	.0	.0	.0	.0	.0
2. NW	*	8.	.3	*	.0	.1	.0	.2	.0	.0	.0	.0
3. SW	*	7.	.4	*	.0	.1	.0	.2	.0	.0	.0	.0
4. NE	*	352.	.3	*	.0	.2	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	272.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	99.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	82.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	269.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	354.	.3	*	.1	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	173.	.3	*	.0	.1	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	6.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	188.	.3	*	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	272.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	95.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	271.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-15 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-16 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	4	-150	4	0	* AG	467	1.6	.0	15.3
B. Oak St NBD	*	4	0	4	150	* AG	877	1.2	.0	13.5
C. Oak St NBL	*	2	-150	0	0	* AG	129	1.7	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	1.0	.0	10.0
E. Oak St SBD	*	0	0	0	-150	* AG	0	1.0	.0	10.0
F. Oak St SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. 14th St EBA	*	-150	-4	0	-4	* AG	1264	1.5	.0	10.0
H. 14th St EBD	*	0	-4	150	-4	* AG	1286	1.1	.0	10.0
I. 14th St EBL	*	-150	-2	0	0	* AG	89	1.7	.0	10.0
J. 14th St WBA	*	150	4	0	4	* AG	678	1.4	.0	10.0
K. 14th St WBD	*	0	4	-150	4	* AG	464	1.0	.0	10.0
L. 14th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Oak St NBAX	*	4	-750	4	-150	* AG	596	1.0	.0	15.3
N. Oak St NBDX	*	4	150	4	750	* AG	877	1.0	.0	13.5
O. Oak St SBAX	*	0	750	0	150	* AG	0	1.0	.0	10.0
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	1.0	.0	10.0
Q. 14th St EBAX	*	-750	-4	-150	-4	* AG	1353	1.0	.0	10.0
R. 14th St EBDX	*	150	-4	750	-4	* AG	1286	1.0	.0	10.0
S. 14th St WBAX	*	750	4	150	4	* AG	678	1.0	.0	10.0

T. 14th St WBDX	*	-150	4	-750	4	* AG	464	1.0	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-16 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	13	-10	1.8
2. NW	*	-7	10	1.8
3. SW	*	-7	-10	1.8
4. NE	*	12	10	1.8
5. ES mdblk	*	150	-10	1.8
6. WN mdblk	*	-150	10	1.8
7. WS mdblk	*	-150	-10	1.8
8. EN mdblk	*	150	10	1.8
9. SE mdblk	*	13	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-10	1.8
14. WN blk	*	-600	10	1.8
15. WS blk	*	-600	-10	1.8
16. EN blk	*	600	10	1.8
17. SE blk	*	13	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-16 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
2. NW	*	97.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	83.	.4	*	.0	.0	.0	.0	.0	.0	.0	.2
4. NE	*	261.	.3	*	.0	.0	.0	.0	.0	.0	.1	.0
5. ES mdblk	*	277.	.3	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	97.	.3	*	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	83.	.4	*	.0	.0	.0	.0	.0	.0	.2	.0
8. EN mdblk	*	263.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	354.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	6.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	187.	.2	*	.0	.1	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	6.	.1	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-16 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-17 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	5	-150	5	0	* AG	938	1.4	.0	10.0
B. Oak St NBD	*	5	0	5	150	* AG	969	1.0	.0	10.0
C. Oak St NBL	*	2	-150	0	0	* AG	192	1.7	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	1.0	.0	11.8
E. Oak St SBD	*	0	0	0	-150	* AG	0	1.0	.0	11.8
F. Oak St SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. 10th St EBA	*	-150	-4	0	-4	* AG	66	1.6	.0	17.0
H. 10th St EBD	*	0	-4	150	-4	* AG	147	1.1	.0	15.3
I. 10th St EBL	*	-150	-2	0	0	* AG	2	1.7	.0	10.0
J. 10th St WBA	*	150	2	0	2	* AG	462	1.8	.0	10.0
K. 10th St WBD	*	0	2	-150	2	* AG	544	1.7	.0	10.0
L. 10th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Oak St NBAX	*	5	-750	5	-150	* AG	1130	1.0	.0	10.0
N. Oak St NBDX	*	5	150	5	750	* AG	969	1.0	.0	10.0
O. Oak St SBAX	*	0	750	0	150	* AG	0	1.0	.0	11.8
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	1.0	.0	11.8
Q. 10th St EBAX	*	-750	-4	-150	-4	* AG	68	1.0	.0	17.0
R. 10th St EBDX	*	150	-4	750	-4	* AG	147	1.0	.0	15.3
S. 10th St WBAX	*	750	2	150	2	* AG	462	1.0	.0	10.0

T. 10th St WBDX	*	-150	2	-750	2	* AG	544	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-17 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	12	-13	1.8
2. NW	*	-7	8	1.8
3. SW	*	-7	-14	1.8
4. NE	*	12	8	1.8
5. ES mdblk	*	150	-13	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	12	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-13	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	12	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-17 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	188.	* .2	*	.2	.0	.0	.0	.0	.0	.0	.0
2. NW	*	171.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	82.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	187.	* .3	*	.2	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	277.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	97.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	83.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	263.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	352.	* .3	*	.2	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	9.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	185.	* .2	*	.0	.1	.0	.0	.0	.0	.0	.0
13. ES blk	*	276.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	96.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	354.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-17 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-18 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Madison NBA	*	0	-150	0	0	* AG	0	1.0	.0	13.5
B. Madison NBD	*	0	0	0	150	* AG	0	1.0	.0	11.8
C. Madison NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Madison SBA	*	-5	150	-5	0	* AG	957	1.7	.0	10.0
E. Madison SBD	*	-5	0	-5	-150	* AG	2533	1.8	.0	10.0
F. Madison SBL	*	-2	150	0	0	* AG	312	1.8	.0	10.0
G. 7th St EBA	*	-150	-7	0	-7	* AG	3001	1.6	.0	15.3
H. 7th St EBD	*	0	-7	150	-7	* AG	1737	1.1	.0	15.3
I. 7th St EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. 7th St WBA	*	150	0	0	0	* AG	0	1.0	.0	10.0
K. 7th St WBD	*	0	0	-150	0	* AG	0	1.0	.0	10.0
L. 7th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Madison NBAX	*	0	-750	0	-150	* AG	0	1.0	.0	13.5
N. Madison NBDX	*	0	150	0	750	* AG	0	1.0	.0	11.8
O. Madison SBAX	*	-5	750	-5	150	* AG	1269	1.0	.0	10.0
P. Madison SBDX	*	-5	-150	-5	-750	* AG	2533	1.0	.0	10.0
Q. 7th St EBAX	*	-750	-7	-150	-7	* AG	3001	1.0	.0	15.3
R. 7th St EBDX	*	150	-7	750	-7	* AG	1737	1.0	.0	15.3
S. 7th St WBAX	*	750	0	150	0	* AG	0	1.0	.0	10.0

T. 7th St WBDX	*	-150	0	-750	0	* AG	0	1.0	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-18 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-16	1.8
2. NW	*	-12	7	1.8
3. SW	*	-12	-16	1.8
4. NE	*	7	7	1.8
5. ES mdblk	*	150	-16	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-16	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-12	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	7	150	1.8
13. ES blk	*	600	-16	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-16	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-12	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	7	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-18 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	278.	.7	*	.0	.0	.0	.0	.2	.0	.5	.0
2. NW	*	172.	.8	*	.0	.0	.0	.0	.5	.0	.2	.0
3. SW	*	31.	.7	*	.0	.0	.0	.0	.3	.0	.3	.0
4. NE	*	259.	.5	*	.0	.0	.0	.0	.0	.0	.3	.0
5. ES mdblk	*	275.	.4	*	.0	.0	.0	.0	.0	.0	.0	.2
6. WN mdblk	*	101.	.4	*	.0	.0	.0	.0	.0	.0	.3	.0
7. WS mdblk	*	81.	.6	*	.0	.0	.0	.0	.0	.0	.5	.0
8. EN mdblk	*	264.	.3	*	.0	.0	.0	.0	.0	.0	.0	.1
9. SE mdblk	*	349.	.3	*	.0	.0	.0	.0	.3	.0	.0	.0
10. NW mdblk	*	174.	.4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	8.	.6	*	.0	.0	.0	.0	.5	.0	.0	.0
12. NE mdblk	*	187.	.3	*	.0	.0	.0	.1	.0	.0	.0	.0
13. ES blk	*	276.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	264.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-18 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-19 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Oak St NBA	*	5	-150	5	0	* AG	2085	1.8	.0	10.0
B. Oak St NBD	*	5	0	5	150	* AG	1104	1.2	.0	10.0
C. Oak St NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. Oak St SBA	*	0	150	0	0	* AG	0	1.0	.0	10.0
E. Oak St SBD	*	0	0	0	-150	* AG	0	1.0	.0	10.0
F. Oak St SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. 7th St EBA	*	-150	-7	0	-7	* AG	1498	1.4	.0	13.5
H. 7th St EBD	*	0	-7	150	-7	* AG	2683	1.1	.0	11.8
I. 7th St EBL	*	-150	-2	0	0	* AG	204	1.8	.0	10.0
J. 7th St WBA	*	150	0	0	0	* AG	0	1.0	.0	13.5
K. 7th St WBD	*	0	0	-150	0	* AG	0	1.0	.0	13.5
L. 7th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Oak St NBAX	*	5	-750	5	-150	* AG	2085	1.0	.0	10.0
N. Oak St NBDX	*	5	150	5	750	* AG	1104	1.0	.0	10.0
O. Oak St SBAX	*	0	750	0	150	* AG	0	1.0	.0	10.0
P. Oak St SBDX	*	0	-150	0	-750	* AG	0	1.0	.0	10.0
Q. 7th St EBAX	*	-750	-7	-150	-7	* AG	1702	1.0	.0	13.5
R. 7th St EBDX	*	150	-7	750	-7	* AG	2683	1.0	.0	11.8
S. 7th St WBAX	*	750	0	150	0	* AG	0	1.0	.0	13.5

T. 7th St WBDX	*	-150	0	-750	0	* AG	0	1.0	.0	13.5

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-19 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	12	-14	1.8
2. NW	*	-7	8	1.8
3. SW	*	-7	-15	1.8
4. NE	*	12	8	1.8
5. ES mdblk	*	150	-14	1.8
6. WN mdblk	*	-150	8	1.8
7. WS mdblk	*	-150	-15	1.8
8. EN mdblk	*	150	8	1.8
9. SE mdblk	*	12	-150	1.8
10. NW mdblk	*	-7	150	1.8
11. SW mdblk	*	-7	-150	1.8
12. NE mdblk	*	12	150	1.8
13. ES blk	*	600	-14	1.8
14. WN blk	*	-600	8	1.8
15. WS blk	*	-600	-15	1.8
16. EN blk	*	600	8	1.8
17. SE blk	*	12	-600	1.8
18. NW blk	*	-7	600	1.8
19. SW blk	*	-7	-600	1.8
20. NE blk	*	12	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-19 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	278.	.6	.2	.0	.0	.0	.0	.0	.2	.0
2. NW	*	169.	.4	.3	.0	.0	.0	.0	.0	.0	.0
3. SW	*	82.	.5	.2	.0	.0	.0	.0	.0	.0	.3
4. NE	*	188.	.6	.4	.0	.0	.0	.0	.0	.0	.1
5. ES mdblk	*	277.	.4	.0	.0	.0	.0	.0	.0	.0	.3
6. WN mdblk	*	98.	.3	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	84.	.4	.0	.0	.0	.0	.0	.0	.2	.0
8. EN mdblk	*	261.	.2	.0	.0	.0	.0	.0	.0	.0	.1
9. SE mdblk	*	351.	.5	.5	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	174.	.2	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	11.	.3	.3	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	185.	.3	.0	.2	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.4	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.2	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	262.	.2	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	.3	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.1	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.2	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-19 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
17. SE blk	*	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-20 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. Conventi NBA	*	2	-150	2	0	* AG	10	1.6	.0	10.0
B. Conventi NBD	*	2	0	2	150	* AG	0	1.1	.0	10.0
C. Conventi NBL	*	2	-150	0	0	* AG	0	1.1	.0	10.0
D. Conventi SBA	*	0	150	0	0	* AG	0	1.1	.0	13.5
E. Conventi SBD	*	0	0	0	-150	* AG	10	1.2	.0	13.5
F. Conventi SBL	*	-2	150	0	0	* AG	0	1.1	.0	10.0
G. 12th St EBA	*	-150	-5	0	-5	* AG	3386	1.7	.0	13.5
H. 12th St EBD	*	0	-5	150	-5	* AG	3386	1.4	.0	10.0
I. 12th St EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. 12th St WBA	*	150	5	0	5	* AG	1444	1.4	.0	10.0
K. 12th St WBD	*	0	5	-150	5	* AG	1444	1.1	.0	10.0
L. 12th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. Convent NBAX	*	2	-750	2	-150	* AG	10	1.1	.0	10.0
N. Convent NBDX	*	2	150	2	750	* AG	0	1.1	.0	10.0
O. Convent SBAX	*	0	750	0	150	* AG	0	1.1	.0	13.5
P. Convent SBDX	*	0	-150	0	-750	* AG	10	1.1	.0	13.5
Q. 12th St EBAX	*	-750	-5	-150	-5	* AG	3386	1.0	.0	13.5
R. 12th St EBDX	*	150	-5	750	-5	* AG	3386	1.0	.0	10.0
S. 12th St WBAX	*	750	5	150	5	* AG	1444	1.0	.0	10.0

T. 12th St WBDX	*	-150	5	-750	5	* AG	1444	1.0	.0	10.0		

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-20 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	8	-12	1.8
2. NW	*	-8	12	1.8
3. SW	*	-8	-14	1.8
4. NE	*	8	12	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	12	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	12	1.8
9. SE mdblk	*	8	-150	1.8
10. NW mdblk	*	-8	150	1.8
11. SW mdblk	*	-8	-150	1.8
12. NE mdblk	*	8	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	12	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	12	1.8
17. SE blk	*	8	-600	1.8
18. NW blk	*	-8	600	1.8
19. SW blk	*	-8	-600	1.8
20. NE blk	*	8	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-20 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	277.	.8	*	.0	.0	.0	.0	.0	.0	.6	.0
2. NW	*	99.	.5	*	.0	.0	.0	.0	.0	.0	.0	.2
3. SW	*	279.	.8	*	.0	.0	.0	.0	.0	.0	.6	.0
4. NE	*	260.	.5	*	.0	.0	.0	.0	.0	.0	.3	.0
5. ES mdblk	*	278.	.8	*	.0	.0	.0	.0	.0	.0	.0	.6
6. WN mdblk	*	99.	.6	*	.0	.0	.0	.0	.0	.0	.2	.0
7. WS mdblk	*	82.	.8	*	.0	.0	.0	.0	.0	.0	.6	.0
8. EN mdblk	*	262.	.6	*	.0	.0	.0	.0	.0	.0	.0	.2
9. SE mdblk	*	322.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	213.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	323.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	216.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	277.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	83.	.5	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	263.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	356.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	182.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	3.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	183.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-20 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.2
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.2	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-21 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 1st Ave NBA	*	11	-150	11	0	* AG	620	1.4	.0	10.0
B. 1st Ave NBD	*	11	0	11	150	* AG	620	1.1	.0	10.0
C. 1st Ave NBL	*	9	-150	0	0	* AG	824	1.8	.0	10.0
D. 1st Ave SBA	*	-5	150	-5	0	* AG	2133	1.6	.0	10.0
E. 1st Ave SBD	*	-5	0	-5	-150	* AG	3386	1.4	.0	10.0
F. 1st Ave SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. 11th/12t EBA	*	-150	-5	0	-5	* AG	1253	1.8	.0	13.5
H. 11th/12t EBD	*	0	-5	150	-5	* AG	0	1.0	.0	10.0
I. 11th/12t EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. 11th/12t WBA	*	150	0	0	0	* AG	0	1.0	.0	10.0
K. 11th/12t WBD	*	0	0	-150	0	* AG	824	1.7	.0	10.0
L. 11th/12t WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. 1st Ave NBAX	*	11	-750	11	-150	* AG	1444	1.0	.0	10.0
N. 1st Ave NBDX	*	11	150	11	750	* AG	620	1.0	.0	10.0
O. 1st Ave SBAX	*	-5	750	-5	150	* AG	2133	1.0	.0	10.0
P. 1st Ave SBDX	*	-5	-150	-5	-750	* AG	3386	1.0	.0	10.0
Q. 11th/12 EBAX	*	-750	-5	-150	-5	* AG	1253	1.0	.0	13.5
R. 11th/12 EBDX	*	150	-5	750	-5	* AG	0	1.0	.0	10.0
S. 11th/12 WBAX	*	750	0	150	0	* AG	0	1.0	.0	10.0

T. 11th/12 WBDX	*	-150	0	-750	0	* AG	824	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-21 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	17	-12	1.8
2. NW	*	-12	7	1.8
3. SW	*	-12	-14	1.8
4. NE	*	17	7	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-14	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	17	-150	1.8
10. NW mdblk	*	-12	150	1.8
11. SW mdblk	*	-12	-150	1.8
12. NE mdblk	*	17	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-14	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	17	-600	1.8
18. NW blk	*	-12	600	1.8
19. SW blk	*	-12	-600	1.8
20. NE blk	*	17	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-21 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	.6	*	.0	.0	.0	.0	.1	.0	.2	.0
2. NW	*	171.	.9	*	.0	.0	.0	.0	.5	.0	.1	.0
3. SW	*	170.	.8	*	.0	.0	.0	.0	.6	.0	.0	.0
4. NE	*	263.	.5	*	.0	.0	.0	.0	.0	.0	.2	.0
5. ES mdblk	*	271.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	102.	.5	*	.0	.0	.0	.0	.0	.0	.2	.0
7. WS mdblk	*	79.	.4	*	.0	.0	.0	.0	.0	.0	.3	.0
8. EN mdblk	*	267.	.2	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	347.	.5	*	.1	.0	.2	.0	.2	.0	.0	.0
10. NW mdblk	*	174.	.6	*	.0	.0	.0	.4	.0	.0	.0	.0
11. SW mdblk	*	9.	.7	*	.0	.0	.0	.0	.6	.0	.0	.0
12. NE mdblk	*	188.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	269.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	268.	.0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	352.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	.4	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	.6	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	187.	.3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-21 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.1
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RAJ0606
RUN: 2025PP-22 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 6. (M)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 10. DEGREES TEMP= 10.0 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (M) X1	Y1	X2	Y2	* TYPE	VPH	EF (G/MI)	H (M)	W (M)
A. 14th St NBA	*	4	-150	4	0	* AG	678	1.4	.0	10.0
B. 14th St NBD	*	4	0	4	150	* AG	678	1.1	.0	10.0
C. 14th St NBL	*	2	-150	0	0	* AG	0	1.0	.0	10.0
D. 14th St SBA	*	-4	150	-4	0	* AG	1286	1.5	.0	10.0
E. 14th St SBD	*	-4	0	-4	-150	* AG	2133	1.4	.0	10.0
F. 14th St SBL	*	-2	150	0	0	* AG	0	1.0	.0	10.0
G. 13th St EBA	*	-150	-5	0	-5	* AG	847	1.8	.0	10.0
H. 13th St EBD	*	0	-5	150	-5	* AG	0	1.0	.0	10.0
I. 13th St EBL	*	-150	-2	0	0	* AG	0	1.0	.0	10.0
J. 13th St WBA	*	150	0	0	0	* AG	0	1.0	.0	10.0
K. 13th St WBD	*	0	0	-150	0	* AG	0	1.0	.0	10.0
L. 13th St WBL	*	150	2	0	0	* AG	0	1.0	.0	10.0
M. 14th St NBAX	*	4	-750	4	-150	* AG	678	1.0	.0	10.0
N. 14th St NBDX	*	4	150	4	750	* AG	678	1.0	.0	10.0
O. 14th St SBAX	*	-4	750	-4	150	* AG	1286	1.0	.0	10.0
P. 14th St SBDX	*	-4	-150	-4	-750	* AG	2133	1.0	.0	10.0
Q. 13th St EBAX	*	-750	-5	-150	-5	* AG	847	1.0	.0	10.0
R. 13th St EBDX	*	150	-5	750	-5	* AG	0	1.0	.0	10.0
S. 13th St WBAX	*	750	0	150	0	* AG	0	1.0	.0	10.0

T. 13th St WBDX	*	-150	0	-750	0	* AG	0	1.0	.0	10.0	

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 2

JOB: RAJ0606
RUN: 2025PP-22 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

III. RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (M) X	Y	Z
1. SE	*	10	-12	1.8
2. NW	*	-10	7	1.8
3. SW	*	-10	-12	1.8
4. NE	*	10	7	1.8
5. ES mdblk	*	150	-12	1.8
6. WN mdblk	*	-150	7	1.8
7. WS mdblk	*	-150	-12	1.8
8. EN mdblk	*	150	7	1.8
9. SE mdblk	*	10	-150	1.8
10. NW mdblk	*	-10	150	1.8
11. SW mdblk	*	-10	-150	1.8
12. NE mdblk	*	10	150	1.8
13. ES blk	*	600	-12	1.8
14. WN blk	*	-600	7	1.8
15. WS blk	*	-600	-12	1.8
16. EN blk	*	600	7	1.8
17. SE blk	*	10	-600	1.8
18. NW blk	*	-10	600	1.8
19. SW blk	*	-10	-600	1.8
20. NE blk	*	10	600	1.8

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 3

JOB: RAJ0606
RUN: 2025PP-22 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	*	BRG (DEG)	* PRED CONC (PPM)	*	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. SE	*	276.	* .4	*	.0	.0	.0	.0	.1	.0	.2	.0
2. NW	*	172.	* .5	*	.0	.0	.0	.0	.3	.0	.0	.0
3. SW	*	172.	* .5	*	.0	.0	.0	.0	.4	.0	.0	.0
4. NE	*	188.	* .3	*	.1	.0	.0	.0	.2	.0	.0	.0
5. ES mdblk	*	271.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	104.	* .2	*	.0	.0	.0	.0	.0	.0	.1	.0
7. WS mdblk	*	81.	* .3	*	.0	.0	.0	.0	.0	.0	.2	.0
8. EN mdblk	*	267.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	351.	* .4	*	.1	.0	.0	.0	.2	.0	.0	.0
10. NW mdblk	*	174.	* .4	*	.0	.0	.0	.2	.0	.0	.0	.0
11. SW mdblk	*	8.	* .5	*	.0	.0	.0	.0	.4	.0	.0	.0
12. NE mdblk	*	187.	* .3	*	.0	.1	.0	.1	.0	.0	.0	.0
13. ES blk	*	269.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	97.	* .1	*	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	84.	* .2	*	.0	.0	.0	.0	.0	.0	.0	.0
16. EN blk	*	268.	* .0	*	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	353.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
18. NW blk	*	174.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0
19. SW blk	*	7.	* .4	*	.0	.0	.0	.0	.0	.0	.0	.0
20. NE blk	*	186.	* .3	*	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 4

JOB: RAJ0606
RUN: 2025PP-22 (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	*	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. SE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. NW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NE	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. ES mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. WN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. WS mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. EN mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
9. SE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10. NW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
11. SW mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12. NE mdblk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
13. ES blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
14. WN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
15. WS blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
16. EN blk	*	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
17. SE blk	*	.0	.0	.0	.0	.1	.0	.0	.1	.0	.0	.0	.0
18. NW blk	*	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
19. SW blk	*	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0
20. NE blk	*	.0	.0	.0	.0	.0	.1	.1	.0	.0	.0	.0	.0

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

APPENDIX I

ARBORIST REPORT

HORTSCIENCE INC.

TREE ASSESSMENT

Measure DD Implementation Project
Lake Merritt and Lake Merritt Channel Area
Oakland CA

PREPARED FOR:
LSA Associates, Inc.
2215 Fifth Street
Berkeley CA 94710

PREPARED BY:
HortScience, Inc.
2150 Rheem Drive, Suite A
Pleasanton CA 94588

June 2007

Executive Summary

The City of Oakland is proposing to implement Measure DD project components in four areas in proximity to Lake Merritt. These project components are referred to as the 12th Street Reconstruction, Lakeshore Avenue, the Boat House and Channel projects.

As part of the planning for these projects, the City retained LSA Associates to prepare an Environmental Impact Report. LSA Associates retained HortScience, Inc. to assess 269 trees proposed for removal in the following manner:

1. **Evaluation of tree health and structural condition.** Among the 269 trees, 6 were dead and 84 were in poor condition. Seventy-eight (78) trees were in either good or excellent condition. Trees were generally mature in development.
2. **Evaluation of the potential to relocate.** The potential to successfully relocate the 263 living trees was evaluated considering the health and structural condition, species response to relocation, age and maturity and site conditions for each tree. Three trees were identified as having good potential for relocation.
3. **Assessment of the risk of tree failure.** The risk that a tree would fail and injure a person or damage property was evaluated using the methods contained in *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas (*Matheny & Clark. 1994 2nd edition). Trees were rated on a scale of 3 to 12, where 12 represents highest risk. No trees were rated 11 or 12. Three trees received rating of 10; seven trees received rating of 9.
4. **Appraisal of value.** The value of 263 living trees was established using the trunk formula method identified in the *Guide for Plant Appraisal* (9th edition). This is the standard resource for appraisal of the value of landscape trees and considers the species, size (trunk diameter), condition and location. Using this method, the value of the trees was $371,950.
5. **Evaluation of the economic and environmental benefits.** Using STRATUM, one of the i-Tree suite of software products developed by the USDA Forest Service, the contributions of the trees to energy conservation, air quality, carbon dioxide removal and other values were calculated.
6. **Evaluation of proposed project plans and impacts to trees.** Proposed plans for each of the project areas were reviewed. In almost all cases, the surveyed trees fell into areas proposed for development.

I recommend preservation of 5 trees and removal of 264 (including 6 dead trees). The five trees recommended for relocation or preservation in place include: relocation of coast live oak #80 (12th Street area) and preservation in place of trident maple #258 (12th Street area), southern magnolias #121 and #127 (12th Street area) and flowering cherry #35ee (Lakeshore area).

Exhibit 6b: City of Oakland Measure DD Implementation Project Final Environmental Impact Report, adopted February 13, 2008

Tree Assessment
Measure DD Implementation Project
Lake Merritt Area
Oakland CA

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Attachments

i-Tree Outputs

Tree Survey Forms

Introduction and Overview

The City of Oakland is proposing to implement Measure DD project components in several areas in proximity to Lake Merritt. Four project components have been proposed:

- **12th Street Reconstruction.** Re-development of the area between the west end of the Lake and the Henry Kaiser Auditorium, including removal and realignment of existing 12th and 14th Streets. Nearly all trees between the Kaiser Auditorium and the Lake in this area would be removed by the project and were surveyed.
- **Lakeshore Avenue.** Landscape improvements in the area between Lakeshore Avenue and the Lake, from the pergola to the intersection with 12th Street. Surveyed trees were evenly distributed throughout the project area.
- **Boat House.** Project encompasses renovation of the Boat House structure on the north side of the Lake including its conversion to a restaurant, new landscape treatment and replacing the retaining wall on the edge of the water. Trees were concentrated in the area immediately adjacent to the structure.
- **Channel.** Restoration and enlargement of the channel from the west end of the Lake to the intersection with I-880. Surveyed trees were concentrated near overcrossings and along the south side of the channel adjacent to the Oakland Unified School District property.

As part of the environmental review process for these projects, the City retained LSA Associates to prepare an Environmental Impact Report (EIR). Proposed tree removal is one potential impact being evaluated in the EIR. LSA Associates retained HortScience, Inc. to assess the trees proposed for removal. This report presents the following information:

1. Evaluation of tree health and structural condition.
2. Evaluation of the potential for relocation.
3. Assessment of the risk of tree failure.
4. Appraisal of value.
5. Evaluation of the economic and environmental benefits.
6. Evaluation of proposed project plans and impacts to trees.
7. Recommendations for action.

Survey Methods

Trees were evaluated in March 2007. The scope of the survey was identified by the City of Oakland and focused on trees that were scheduled for removal within the proposed project areas. Trees scheduled for preservation were not assessed. The City provided plans for individual projects. Trees were identified by number, species and trunk diameter. We have retained the numbering system. Trees were not, however, tagged with numerically coded tags.

The survey method consisted of the following steps:

1. Verifying the tree's presence as noted on project plans.
2. Identifying the species.

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Survey method continued.

3. Measuring the diameter of the trunk at 54" above grade. Where trees had more than one stem, the diameter of each stem was measured.

4. Visually assessing tree health and structural condition using a 6-point scale where 0=dead, 1=poor and 5=excellent condition.

5. Recording the tree's stage of development as young, semi-mature, mature and over-mature where the stages are defined as follows:
   - Young. Newly planted or just established. Actively growing. May still be staked to nursery stake.
   - Semi-mature. Established in the site. Actively growing. Has not yet reached mature height.
   - Mature. Growth rate has declined as tree reached mature height and crown spread.
   - Overmature. Senescent. Declining in health and/or structure.

6. Identifying site conditions that might limit the capacity to relocate the trees including slope and proximity of streets, buildings and other infrastructure.

7. Identifying any present or potential conflicts between the tree and associated infrastructure such as pavement displacement, obstruction of signs and nuisance fruit litter. Conflicts were rated as:
   - Yes. Conflict with infrastructure is currently present.
   - No. No conflict exists at present and the potential for one in the future is low.
   - Potential. A conflict with infrastructure may develop during the plant's lifetime.

8. Rating the risk associated with the failure of each tree. The assessment method is detailed in the ***Risk Assessment*** section.

9. Recording the presence of defects in structure, insects or diseases and other aspects of development.

Description of Trees

Two hundred sixty-nine (269) trees were evaluated, representing 43 species (Table 1, following page). This total does not include six trees identified on the plans but could not be located in the field. In the 12th Street area, missing trees were flowering cherry #24, southern magnolia #70, eucalyptus #110, California incense cedar #149 and yew #215. In the Boat House area, Australian tea tree #11 was not found.

A group of five California incense cedars was not included on the site plans for the 12th Street, area and were added to the survey as #1000-1005. There also appeared to be two trees #157 on the 12th Street plans. We noted them as #157 and #157.1.

In general, disease and insect pressure was minimal with the exception of Monterey pines as described below. Trees in poor condition were most often mature and overmature in development. It appeared that irrigation had been inadequate for some time.

Pine pitch canker and red turpentine beetle were present in Monterey pines. There is little that can be done to treat these problems. In addition, it is likely that mature pines and those in poor condition were infested by the 5-spined engraver beetle, as this pest attacks stressed and senescent trees. The presence of engraver beetles could not be verified from our ground survey as the pest is small and normally restricted to the upper crown.

Sunscald and bleeding were present along the trunks of flowering cherries. These are abiotic disorders rather than biotic in nature. Sunscald develops under conditions of high summer temperatures and water stress. These conditions are most problematic when the cherries are present in small cut-outs in the pavement of parking lots. Bleeding is a response to mechanical wounding.

The surveyed trees were planted as part of landscape development. Although species such as coast live oak, bigleaf maple and coast redwood are native to the Oakland area, they were not indigenous to the site. It is possible that a small group of Fremont cottonwoods and individual boxelder trees in the channel area were seeded into the area and may be considered indigenous to the site.

12th Street Reconstruction Area

Of the 165 trees in this area, flowering cherry (42) and California incense cedar (34) were the most numerous. Cherries were a mix of semi-mature and mature individuals, concentrated in the parking lot of the Kaiser Auditorium where they had been planted in small pavement cut-outs. Condition was generally good.

In contrast, the incense cedars were located in the street area between the parking lot and the Lake. Over two-thirds of the incense cedars were either dead or in poor condition. Trees in good condition were young and in protected locations.

Among the remaining species were 16 southern magnolias in the Auditorium parking lot. The magnolias were mature and semi-mature in development, located in pavement cut-outs or planters, and evenly divided between fair and good condition. Fifteen (15) Monterey pines were mature and overmature in development, and in poor condition. A 9" pine (#9) was in good condition. Ten (10) crabapples were mature in development and in poor condition.

Also notable were a mature trident maple (#258) in good condition and a mature yew (#139) in fair condition.

Among living trees approximately 20% had either an existing or potential conflict with infrastructure. Twelve (12) trees had displaced pavement whether sidewalk, curb or retaining walls. Another 16 had the potential to do so. Southern magnolia accounted for 15 of the existing and potential conflicts. Tree species with messy fruit included crabapple and sweetgum. These resulted in seven situations where fruit falls onto pavement, and two where this may occur in the future.

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Table 1. Tree Condition & Frequency of Occurrence. Lake Merritt Area. Oakland CA.

Common name	Scientific name	Condition					No. of Trees
		Dead	Poor	Fair	Good	Excell.	
12th Street							
Bailey's acacia	*Acacia baileyana*	--	--	1	--	--	1
Blackwood acacia	*Acacia melanoxylon*	--	4	--	1	--	5
Trident maple	*Acer buergerianum*	--	--	--	1	--	1
Calif. incense cedar	*Calocedrus decurrens*	2	21	8	2	1	34
Cordyline	*Cordyline australis*	--	--	1	--	--	1
Washington hawthorn	*Craetagus phaenopyrum*	--	1	--	--	--	1
Monterey cypress	*Cupressus macrocarpa*	--	1	--	--	--	1
Red ironbark	*Eucalyptus sideroxylon*	--	--	1	--	--	1
Ginkgo	*Ginkgo biloba*	--	--	--	1	--	1
Japanese privet	*Ligustrum japonicum*	--	--	--	1	--	1
Sweetgum	*Liquidambar styraciflua*	--	--	4	1	--	5
Southern magnolia	*Magnolia grandiflora*	--	1	6	8	1	16
Crabapple	*Malus* sp.	1	7	2	--	--	10
Flax-leaf paperbark	*Melaleuca linariifolia*	--	2	--	--	--	2
Canary Island pine	*Pinus canariensis*	--	--	--	4	--	4
Monterey pine	*Pinus radiata*	1	8	5	1	--	15
Pittosporum	*Pittosporum eugenioides*	--	1	8	--	--	9
Victorian box	*Pittosporum undulatum*	--	1	1	--	--	2
Purpleleaf plum	*Prunus cerasifera* 'Atropurpurea'	--	--	1	--	--	1
Flowering cherry	*Prunus serrulata*	--	3	2	17	20	42
Coast live oak	*Quercus agrifolia*	--	1	1	2	--	4
Coast redwood	*Sequoia sempervirens*	--	--	4	3	--	7
Yew	*Taxus* sp.	--	--	1	--	--	1
Site sub-total		**4**	**51**	**46**	**42**	**22**	**165**
Boat House							
Blackwood acacia	*Acacia melanoxylon*	1	--	--	--	--	1
Hollywood juniper	*Juniperus chinensis* 'Kaizuka'	--	--	1	--	--	1
Australian tea tree	*Leptospermum laevigatum*	--	--	3	--	--	3
Crabapple	*Malus* sp.	--	2	--	--	--	2
Monterey pine	*Pinus radiata*	--	--	1	--	--	1
Victorian box	*Pittosporum undulatum*	--	--	3	--	--	3
Weeping willow	*Salix alba* 'Tristis'	--	2	2	1	--	5
Austr. brush cherry	*Syzygium paniculatum*	--	--	4	--	--	4
Site sub-total		**1**	**4**	**14**	**1**	**0**	**20**

Table 1, continued. Tree Condition & Frequency of Occurrence. Lake Merritt Area. Oakland CA.

Common name	Scientific name	Condition					No. of Trees
		Dead	Poor	Fair	Good	Excell.	
Channel							
Boxelder	*Acer negundo*	--	4	4	--	--	8
Nichol's gum	*Eucalyptus nicholi*	--	--	--	2	--	2
Evergreen ash	*Fraxinus uhdei*	--	1	2	1	--	4
Japanese privet	*Ligustrum japonicum*	--	--	2	2	--	4
Flax-leaf paperbark	*Melaleuca linariifolia*	--	--	1	--	--	1
Monterey pine	*Pinus radiata*	1	5	1	1	--	8
London plane	*Platanus x acerifolia*	--	--	--	--	1	1
Lombardy poplar	*Populus nigra* 'Italica'	--	4	16	1	--	21
Coast live oak	*Quercus agrifolia*	--	--	3	1	--	4
Holly oak	*Quercus ilex*	--	--	1	1	--	2
Coast redwood	*Sequoia sempervirens*	--	2	1	1	--	4
Site sub-total		**1**	**16**	**31**	**10**	**1**	**59**
Lakeshore Drive							
Bigleaf maple	*Acer macrophyllum*	--	1	1	--	--	2
Blackwood acacia	*Acacia melanoxylon*	--	2	--	--	--	2
Horse chestnut	*Aseculus carnea*	--	1	--	--	--	1
Bottlebrush	*Callistemon sp.*	--	--	2	--	--	2
Calif. incense cedar	*Calocedrus decurrens*	--	--	1	--	--	1
Red flowering gum	*Eucalyptus ficifolia*	--	1	--	--	--	1
Blue gum	*Eucalyptus globulus*	--	--	1	--	--	1
Honeylocust	*Gleditsia triacanthos* f. *inermis*	--	1	1	--	--	2
Monterey pine	*Pinus radiate*	--	2	1	--	--	3
Fern pine	*Podocarpus gracilior*	--	--	--	1	--	1
Flowering cherry	*Prunus serrulata*	--	4	2	1	--	7
Red oak	*Quercus rubra*	--	1	--	--	--	1
Chinese elm	*Ulmus parvifolia*	--	--	1	--	--	1
Site sub-total		**0**	**13**	**10**	**2**	**0**	**25**
Total, all trees surveyed		**6**	**84**	**101**	**55**	**23**	**269**

Boat House

The 21 trees surveyed near the Boat House were concentrated either along the Lake itself or near the building. The dominant tree in this area, a huge specimen eucalyptus, will be retained and was not evaluated. Five weeping willows were located in the lawn between the building and Lakeside Drive. Two (#14, 24) were in poor condition, two (#9, 15) were fair and tree #25 was in good condition. All were mature in development, distinguished by the amount of decay in the trunk and the structure of the crown.

Four Australian brush cherries were on the east side of the structure. These were mature in development and in fair condition. They had been topped in the past, presumably to reduce the production of messy fruit.

An overmature Monterey pine (#42`) was 43" in diameter and in fair condition. It was located at the east end of the project area.

Species with messy fruit, notably Australian brush cherry and Victorian box accounted for seven existing conflicts with pavement, mostly sidewalk and driveways.

Channel area

Fifty-nine (59) trees were assessed in the area of the channel. The most common species was Lombardy poplar (21), which had been widely used as a landscape tree. Also present was a small group of poplars just west of the 10th Street overcrossing. Although they lack the crown form typical of this cultivar, we identified these as Lombardy poplars as they appeared to be sprouts from either a fallen or removed tree. Lombardy poplars were mature in development and in generally fair condition.

Also present in this area were eight Monterey pines and eight boxelders. Both were located on the south side of the channel near the Oakland Unified School District property. Pines were mature and overmature, and in poor condition. One pine was dead. Boxelders were mature in development, evenly divided between poor and fair condition.

Among the 58 living trees in this area, 14 conflicts with infrastructure were present: four associated with fruit drop from Japanese privet trees and 10 conflicts with infrastructure on the south side of the channel where boxelder and Monterey pine trees are close to the School District parking lot and retaining wall. I identified 26 trees that have the potential to develop conflicts with infrastructure including six semi-mature trees located near pavement. In addition, I believe the 20 Lombardy poplars in this area have the potential to develop conflicts in the future due to the species known trait of suckering from the roots.

Lakeshore Drive

Among the 25 trees in the Lakeshore Drive project area were seven flowering cherries at the east end. The cherries were generally in poor condition. Also present were a number of mature and overmature trees of a variety of species. Included in this group were three Monterey pines, two blackwood acacias and a red flowering gum. All had significant defects in structure including lean and a history of failure.

Near the pergola were a mature California incense cedar and a Chinese elm. Both trees were in fair overall condition. A scaffold limb had failed from the elm, which had poor overall structure. The upper crown of the incense cedar was dead. Because the trees are growing in close proximity to the structure both had one-sided crowns. For example, the incense cedar on the east side of the pergola had live branches only on the east. I identified both of these trees as conflicting with infrastructure as they must be pruned to provide clearance to the structure.

Fern pine #111 has displaced the adjacent curb and represents a significant conflict with infrastructure.

Potential for Relocation

Trees were evaluated for their potential to be transplanted successfully. Four factors influence this potential:

- **Species response.** Some species have a higher rate of transplant success than do others. This response is not the same as success in establishing nursery stock, i.e., planting trees grown in containers. Rather it focused on the ability to relocate established trees. For example, coast redwood and coast live oak are generally regarded as easy to relocate while Monterey pine and eucalyptus are not.
- **Health and structural condition.** Trees in good health and with good structure are more likely to survive the relocation process than those in poor health or those possessing significant structural defects.
- **Age and maturity.** Young trees are far more likely to be successfully relocated than mature trees.
- **Site considerations.** The best candidate for relocation is a tree located in an open area on flat ground, away from other trees and infrastructure. Trees growing on slopes are more difficult to excavate and replant.

Each of these factors, in and of itself, may limit the potential for relocation. For example, even a semi-mature Monterey pine in excellent condition growing in an open lawn is unlikely to survive relocation due to the species response, and its inability to regenerate new roots following planting.

Using the four factors noted above, the potential to relocate each of the 263 living trees was assessed (Table 2). Given the age and condition of the surveyed trees, almost all (230) had poor suitability for relocation. Thirty (30) trees had moderate potential including 22 flowering cherries. Three (3) trees were assessed as having good potential for relocation:

Tree No.	Location	Species	Diameter
80	12th St.	Coast live oak	18,12
146	12th St.	Canary Island pine	19
35ee	Lakeshore	Flowering cherry	5

Our assessment is not to be considered a recommendation for action. It is only an evaluation of potential success, based on the species present, their health and structural condition, age and maturity, and relevant site constraints. See ***Evaluation of Impacts & Recommendations for Action*** for recommendations.

Table 2. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
12th Street						
1	Washington hawthorn	Moderate	Poor	Mature	Poor	Poor
2	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
3	Monterey pine	Poor	Poor; poor structure	Mature	Poor	Poor
4	Monterey pine	Poor	Poor; poor form	Mature	Poor	Poor
5	Japanese privet	Good	Good	Mature	Poor	Poor
6	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
7	Flowering cherry	Moderate	Good	Mature	Poor	Poor
8	Bailey acacia	Poor	Fair	Mature	Poor	Poor
9	Monterey pine	Poor	Good	Young	Poor	Poor
10	Crabapple	Moderate	Poor	Mature	Moderate	Poor
12	Crabapple	Moderate	Poor	Mature	Good	Poor
13	Crabapple	Moderate	Fair	Mature	Moderate	Poor
14	Monterey pine	Poor	Poor	Mature	Poor	Poor
15	Crabapple	Moderate	Fair	Mature	Poor	Poor
16	Crabapple	Moderate	Poor	Mature	Poor	Poor
17	Coast live oak	Good	Good	Semi-mature	Poor	Poor
18	Calif. incense cedar	Poor	Poor	Mature	Moderate	Poor
19	Calif. incense cedar	Poor	Poor	Mature	Moderate	Poor
20	Blackwood acacia	Moderate	Good	Mature	Poor	Poor
21	Flowering cherry	Moderate	Poor	Semi-mature	Moderate	Poor
22	Flowering cherry	Moderate	Good	Semi-mature	Moderate	Moderate
23	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
25	Flowering cherry	Moderate	Poor	Semi-mature	Moderate	Poor
26	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
27	Flowering cherry	Moderate	Good	Mature	Poor	Poor
28	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
29	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
30	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
31	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
32	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
33	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
34	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
35	Flowering cherry	Moderate	Excellent	Mature	Poor	Poor
36	Flowering cherry	Moderate	Excellent	Mature	Moderate	Moderate
37	Flowering cherry	Moderate	Excellent	Mature	Moderate	Moderate
38	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
39	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
40	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
41	Southern magnolia	Moderate	Good	Semi-mature	Poor	Poor
42	Southern magnolia	Moderate	Good	Mature	Poor	Poor
43	Southern magnolia	Moderate	Fair	Mature	Poor	Poor
44	Southern magnolia	Moderate	Fair	Semi-mature	Poor	Poor
45	Southern magnolia	Moderate	Good	Mature	Poor	Poor
46	Southern magnolia	Moderate	Good	Mature	Poor	Poor
47	Southern magnolia	Moderate	Fair	Semi-mature	Poor	Poor
48	Southern magnolia	Moderate	Good	Mature	Poor	Poor
49	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
50	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
51	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
52	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
53	Flowering cherry	Moderate	Good	Semi-mature	Moderate	Moderate
54	Flowering cherry	Moderate	Good	Semi-mature	Moderate	Moderate
55	Flowering cherry	Moderate	Poor	Mature	Moderate	Poor
57	Flowering cherry	Moderate	Fair	Semi-mature	Poor	Poor
58	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
59	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
60	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
61	Flowering cherry	Moderate	Excellent	Semi-mature	Moderate	Moderate
62	Flowering cherry	Moderate	Excellent	Mature	Moderate	Moderate
63	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
64	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
65	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
66	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
67	Flowering cherry	Moderate	Excellent	Semi-mature	Poor	Poor
68	Flax-leaf paperbark	Poor	Poor	Mature	Moderate	Poor
69	Flax-leaf paperbark	Poor	Poor	Mature	Moderate	Poor
72	Calif. incense cedar	Poor	Good	Mature	Good	Poor
73	Calif. incense cedar	Poor	Fair	Mature	Good	Poor
74	Calif. incense cedar	Poor	Fair	Mature	Good	Poor
75	Pittosporum	Good	Fair	Mature	Poor	Poor
76	Pittosporum	Good	Fair	Mature	Good	Poor
77	Pittosporum	Good	Fair	Mature	Good	Poor
78	Pittosporum	Good	Fair	Mature	Good	Poor
79	Pittosporum	Good	Fair	Mature	Good	Poor
80	Coast live oak	Good	Fair	Mature	Good	**Good**
81	Southern magnolia	Moderate	Fair	Young	Poor	Poor
82	Red ironbark	Poor	Fair	Mature	Good	Poor
84	Monterey pine	Poor	Poor; poor form	Mature	Poor	Poor
85	Calif. incense cedar	Poor	Poor	Mature	Good	Poor
88	Coast live oak	Good	Poor	Semi-mature	Poor	Poor
89	Blackwood acacia	Moderate	Poor	Mature	Poor	Poor
90	Crabapple	Moderate	Poor	Mature	Poor	Poor
92	Crabapple	Moderate	Poor	Mature	Poor	Poor
93	Monterey pine	Poor	Poor; topped	Young	Poor	Poor
94	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
95	Crabapple	Moderate	Poor	Semi-mature	Poor	Poor
96	Pittosporum	Good	Poor; poor form	Mature	Poor	Poor
97	Pittosporum	Good	Fair	Mature	Poor	Poor
98	Pittosporum	Good	Poor	Mature	Poor	Poor
99	Pittosporum	Good	Fair	Mature	Poor	Poor
100	Calif. incense cedar	Poor	Fair	Mature	Moderate	Poor
101	Calif. incense cedar	Poor	Fair	Mature	Moderate	Poor
102	Calif. incense cedar	Poor	Excellent	Young	Poor	Poor
103	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
104	Monterey pine	Poor	Poor; poor structure	Over-mature	Poor	Poor
105	Monterey pine	Poor	Poor	Mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
106	Monterey pine	Poor	Poor	Mature	Poor	Poor
107	Monterey pine	Poor	Poor	Mature	Poor	Poor
108	Flowering cherry	Moderate	Fair	Semi-mature	Poor	Poor
112	Sweetgum	Moderate	Poor; topped	Semi-mature	Moderate	Poor
113	Sweetgum	Moderate	Poor; topped	Semi-mature	Moderate	Poor
114	Sweetgum	Moderate	Poor; topped	Semi-mature	Moderate	Poor
115	Sweetgum	Moderate	Poor; topped	Semi-mature	Poor	Poor
116	Sweetgum	Moderate	Good	Semi-mature	Poor	Poor
120	Southern magnolia	Moderate	Poor	Semi-mature	Poor	Poor
121	Southern magnolia	Moderate	Excellent	Semi-mature	Poor	Poor
122	Southern magnolia	Moderate	Good	Semi-mature	Poor	Poor
123	Southern magnolia	Moderate	Fair	Semi-mature	Poor	Poor
127	Southern magnolia	Moderate	Good	Semi-mature	Poor	Poor
128	Flowering cherry	Moderate	Good	Mature	Moderate	Moderate
129	Southern magnolia	Moderate	Good	Young	Moderate	Moderate
130	Southern magnolia	Moderate	Fair	Semi-mature	Poor	Poor
131	Flowering cherry	Moderate	Good	Mature	Poor	Poor
139	Yew	Moderate	Fair	Mature	Poor	Poor
145	Canary Island pine	Good	Good	Mature	Moderate	Moderate
146	Canary Island pine	Good	Good	Mature	Good	**Good**
147	Blackwood acacia	Moderate	Poor	Mature	Poor	Poor
148	Blackwood acacia	Moderate	Poor	Mature	Poor	Poor
153	Victorian box	Good	Poor	Mature	Good	Poor
154	Victorian box	Good	Fair	Mature	Good	Poor
155	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
157	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
157.1	Canary Island pine	Good	Good	Mature	Moderate	Moderate
159	Coast live oak	Good	Fair	Young	Poor	Poor
160	Calif. incense cedar	Poor	Poor	Mature	Moderate	Poor
161	Calif. incense cedar	Poor	Fair	Mature	Poor	Poor
162	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
164	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
165	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
166	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
167	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
168	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
169	Calif. incense cedar	Poor	Poor	Semi-mature	Moderate	Poor
170	Calif. incense cedar	Poor	Poor	Mature	Moderate	Poor
171	Calif. incense cedar	Poor	Poor	Young	Good	Poor
172	Calif. incense cedar	Poor	Fair	Semi-mature	Good	Moderate
173	Calif. incense cedar	Poor	Poor	Young	Good	Poor
174	Calif. incense cedar	Poor	Fair	Mature	Good	Poor
200	Calif. incense cedar	Poor	Good	Semi-mature	Moderate	Moderate
201	Coast redwood	Good	Poor; poor form	Semi-mature	Poor	Poor
202	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
203	Coast redwood	Good	Fair	Semi-mature	Poor	Poor
204	Coast redwood	Good	Poor; poor structure	Semi-mature	Poor	Poor
205	Blackwood acacia	Moderate	Poor	Mature	Poor	Poor
206	Coast redwood	Good	Good	Semi-mature	Poor	Poor
207	Coast redwood	Good	Fair	Semi-mature	Grove	Poor
211	Ginkgo	Moderate	Good	Semi-mature	Good	Moderate
212	Canary Island pine	Good	Fair	Mature	Moderate	Moderate
213	Crabapple	Moderate	Poor	Mature	Poor	Poor
214	Purpleleaf plum	Good	Fair	Mature	Poor	Poor
251	Coast redwood	Good	Good	Semi-mature	Poor	Poor
253	Coast redwood	Good	Good	Semi-mature	Poor	Poor
256	Cordyline	Good	Fair	Mature	Poor	Poor
258	Trident maple	Moderate	Good	Mature	Poor	Poor
276	Flowering cherry	Moderate	Fair	Mature	Poor	Poor
280	Monterey cypress	Poor	Poor	Semi-mature	Moderate	Poor
1000	Calif. incense cedar	Poor	Poor	Semi-mature	Poor	Poor
1001	Calif. incense cedar	Poor	Poor	Semi-mature	Poor	Poor
1002	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
1003	Calif. incense cedar	Poor	Poor; leaning	Mature	Poor	Poor
1004	Calif. incense cedar	Poor	Poor	Mature	Poor	Poor
Boat House						
9	Weeping willow	Poor	Fair	Mature	Good	Poor
14	Weeping willow	Poor	Poor	Over-mature	Poor	Poor
15	Weeping willow	Poor	Poor; poor form	Over-mature	Poor	Poor
16	Crabapple	Moderate	Poor	Mature	Poor	Poor
17	Crabapple	Moderate	Poor	Mature	Poor	Poor
18	Austr. brush cherry	Good	Fair	Mature	Poor	Poor
19	Austr. brush cherry	Good	Fair	Mature	Poor	Poor
20	Victorian box	Good	Poor; poor structure	Mature	Poor	Poor
21	Austr. brush cherry	Good	Fair	Mature	Poor	Poor
22	Hollywood juniper	Good	Fair	Mature	Poor	Poor
24	Weeping willow	Poor	Poor	Over-mature	Poor	Poor
25	Weeping willow	Poor	Good	Mature	Good	Poor
26	Australian tea tree	Poor	Poor; poor form	Mature	Poor	Poor
28	Australian tea tree	Poor	Poor; poor structure	Mature	Poor	Poor
29	Victorian box	Good	Fair	Mature	Poor	Poor
30	Victorian box	Good	Poor; dieback	Mature	Poor	Poor
11A	Australian tea tree	Poor	Poor; poor structure	Mature	Poor	Poor
21A	Austr. brush cherry	Good	Poor; poor form	Mature	Poor	Poor
42A	Monterey pine	Poor	Fair	Over-mature	Good	Poor
Channel						
1	Monterey pine	Poor	Good	Mature	Moderate	Poor
2	Coast redwood	Good	Good	Semi-mature	Poor	Poor
3	Coast redwood	Good	Poor	Semi-mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
4	Monterey pine	Poor	Fair	Mature	Poor	Poor
5	Japanese privet	Good	Fair	Mature	Poor	Poor
6	Japanese privet	Good	Poor; dieback	Mature	Poor	Poor
7	Coast redwood	Good	Poor	Semi-mature	Poor	Poor
8	Coast redwood	Good	Poor; leans	Semi-mature	Poor	Poor
9	Japanese privet	Good	Poor; poor form	Mature	Poor	Poor
10	Japanese privet	Good	Good	Mature	Poor	Poor
12	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
13	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
14	Monterey pine	Poor	Poor	Over-mature	Moderate	Poor
15	Evergreen ash	Good	Poor; poor form	Semi-mature	Poor	Poor
16	Evergreen ash	Good	Poor; poor form	Semi-mature	Poor	Poor
17	Evergreen ash	Good	Poor	Semi-mature	Poor	Poor
18	Boxelder	Poor	Poor; poor structure	Mature	Poor	Poor
19	Coast live oak	Good	Poor; poor form	Semi-mature	Grove	Poor
20	Coast live oak	Good	Fair	Semi-mature	Poor	Poor
21	Boxelder	Poor	Poor	Mature	Poor	Poor
22	Boxelder	Poor	Poor; poor form	Mature	Poor	Poor
23	Boxelder	Poor	Poor	Mature	Poor	Poor
24	Boxelder	Poor	Fair	Mature	Poor	Poor
25	Coast live oak	Good	Poor; poor structure	Semi-mature	Poor	Poor
26	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
27	Monterey pine	Poor	Poor	Over-mature	Poor	Poor
28	Boxelder	Poor	Poor	Mature	Poor	Poor
29	Boxelder	Poor	Poor	Mature	Poor	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
30	Boxelder	Poor	Poor; poor form	Mature	Poor	Poor
31	Lombardy poplar	Moderate	Fair	Mature	Poor	Poor
32	Lombardy poplar	Moderate	Fair	Mature	Poor	Poor
33	Holly oak	Good	Fair	Semi-mature	Poor	Poor
34	Lombardy poplar	Moderate	Fair	Semi-mature	Poor	Poor
35	Holly oak	Good	Fair	Semi-mature	Poor	Poor
36	Lombardy poplar	Moderate	Fair	Mature	Poor	Poor
37	Lombardy poplar	Moderate	Poor	Mature	Poor	Poor
38	Coast live oak	Good	Poor; poor form	Young	Good	Poor
39	Lombardy poplar	Moderate	Poor	Mature	Good	Poor
40	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
41	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
42	Lombardy poplar	Moderate	Poor; leaning	Mature	Good	Poor
43	Lombardy poplar	Moderate	Poor	Mature	Good	Poor
44	Lombardy poplar	Moderate	Poor	Mature	Good	Poor
45	Lombardy poplar	Moderate	Poor; poor form	Mature	Good	Poor
46	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
47	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
48	Lombardy poplar	Moderate	Poor; structure	Mature	Good	Poor
49	Lombardy poplar	Moderate	Poor; poor form	Mature	Good	Poor
50	Lombardy poplar	Moderate	Fair	Mature	Grove	Poor
51	Lombardy poplar	Moderate	Fair	Semi-mature	Grove	Poor
52	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
53	Lombardy poplar	Moderate	Fair	Mature	Good	Poor
54	Lombardy poplar	Moderate	Fair	Mature	Poor	Poor
55	London plane	Good	Excellent	Semi-mature	Poor	Poor
56	Nichol's gum	Poor	Good	Mature	Moderate	Poor
57	Nichol's gum	Poor	Good	Mature	Moderate	Poor
58	Evergreen ash	Good	Good	Semi-mature	Moderate	Moderate
59	Flax-leaf paperbark	Poor	Poor; poor structure	Mature	Good	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
Lakeshore Ave.						
47	Calif. incense cedar	Poor	Poor; poor form	Mature	Poor	Poor
62	Chinese elm	Moderate	Poor	Mature	Good	Poor
66	Horse chestnut	Poor	Poor	Semi-mature	Good	Poor
69	Flowering cherry	Moderate	Poor	Mature	Good	Poor
74	Bigleaf maple	Poor	Poor	Semi-mature	Good	Poor
78	Blackwood acacia	Poor	Poor	Over-mature	Good	Poor
79	Blackwood acacia	Poor	Poor	Over-mature	Good	Poor
84	Bigleaf maple	Poor	Poor; basal wounds	Young	Good	Poor
91	Monterey pine	Poor	Poor; leans	Over-mature	Moderate	Poor
92	Bottlebrush	Poor	Fair	Mature	Moderate	Poor
99	Monterey pine	Poor	Poor	Over-mature	Moderate	Poor
100	Bottlebrush	Poor	Fair	Mature	Moderate	Poor
102	Monterey pine	Poor	Poor	Over-mature	Moderate	Poor
105	Red oak	Moderate	Poor	Young	Moderate	Poor
106	Honeylocust	Poor	Poor; poor structure	Semi-mature	Moderate	Poor
107	Honeylocust	Poor	Poor	Semi-mature	Moderate	Poor
108	Blue gum	Poor	Poor; poor structure	Mature	Good	Poor
110	Red flowering gum	Poor	Poor	Over-mature	Good	Poor
111	Fern pine	Good	Good	Semi-mature	Poor	Poor
35ae	Flowering cherry	Moderate	Poor; poor form	Semi-mature	Good	Poor
35be	Flowering cherry	Moderate	Poor	Semi-mature	Good	Poor
35de	Flowering cherry	Moderate	Poor	Semi-mature	Good	Poor

Table 2, continued. Assessment of Relocation Potential. Lake Merritt Area. Oakland CA.

Tree No.	Species	Relocation Potential				
		Species response	Health structure	Age	Site factors	Summary
35ee	Flowering cherry	Moderate	Good	Semi-mature	Good	Good
35fe	Flowering cherry	Moderate	Poor; basal wounds	Semi-mature	Good	Poor
35ge	Flowering cherry	Moderate	Poor	Semi-mature	Good	Poor

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Risk Assessment

Tree risk assessment is the systematic process of evaluating the potential for a tree or one of its parts to fail and, in so doing, injure people or damage property. All trees have the potential to fail. The degree of risk will vary with the size of the tree, type and location of the defect, tree species, and the nature of the target. Tree risk assessment involves three components:

1. a tree with the potential to fail,
2. an environment that may contribute to that failure, and
3. a person or object that would be injured or damaged (i.e. the target).

Tree Risk Rating System

All of the surveyed trees were assessed using the procedure contained in *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas* (N. Matheny & J. Clark. 1994 (2nd edition. International Society of Arboriculture. Champaign IL). Following a visual inspection of tree health and structural condition, the part of the tree most likely fail within the next year was identified (e.g. branch, stem, whole tree). The target that would be impacted by this part of the tree was then identified. The risk associated with the tree was evaluated using the following components:

Failure potential (4 points) - identifies the most likely failure and rates the likelihood that the structural defect(s) will result in failure within the next year. The part of the tree most likely to fail was assessed using the following scale:

1 - low - defects are minor (e.g. dieback of twigs, small wounds with good woundwood development)
2 - medium - defects are present and obvious (e.g. lean or bow that has developed over time, cavity encompassing 10-25% of the circumference of the stem, codominant stems without included bark)
3 - high - compounding and/or significant defects present (e.g. severe lean, cavity encompassing 30-50% of the circumference of the stem, multiple pruning wounds with decay along a branch)
4 - severe - defects are very severe (e.g. partial uprooting of leaning tree, decay conks along the main stem, cavity encompassing more than 50% of the stem)

Size of defective part (4 points) - rates the size of the part most likely to fail. Larger parts present a greater potential for damage. Therefore, the size of the failure affects the potential for injury or damage. The scoring system was as follows:

1 - most likely failure less than 6" in diameter
2 - most likely failure 6 - 18" in diameter
3 - most likely failure 18 - 30" in diameter
4 - most likely failure greater than 30" in diameter

Target rating (4 points) - rates the use and occupancy of the area that would be struck by the defective part. For the project areas, the following scoring was employed:

1 - occasional use (e.g. lawn areas, lake, lagoon)
2 - intermittent use (e.g. trails, benches)
3 - frequent use (e.g. street parking, street crossings)
4 - constant use (e.g. major streets, structures)

The points in each category were added to obtain the overall hazard rating, with 3 being the minimum and 12 being the maximum value.

Risk rating = failure potential + size of defective part + target rating

Sixty-one (61) of the surveyed trees had ratings of 7 or greater (Table 3). No trees received ratings of 11 or 12. Three trees received ratings of 10:

- #11, Monterey pine in the Channel area.
- #79, a blackwood acacia along Lakeshore.
- #83, California incense cedar in the 12th St. area. This tree was dead. Although the two stems were relatively small in diameter (8,7"), they would fall into 12th Street.

Five trees in the 12th Street area and one tree each in the Channel and Lakeshore areas received ratings of 9:

- #2, a 27" Monterey pine in poor condition.
- #14, a 32" Monterey pine in poor condition.
- #89, an 18" Blackwood acacia in poor condition.
- #94, a multi-stem Monterey pine in poor condition.
- #168, a 40" Monterey pine in poor condition.
- #27, a 26" Monterey pine in the Channel area in poor condition.
- #91, a 33" Monterey pine in the Lakeshore area in fair condition but leaning.

Seventeen (17) trees had ratings of 8; 33 had ratings of 7.

Under a normal management regime, trees with the highest rating, i.e. 10, would be abated first, followed by those with ratings of 9, then 8, then 7. Removal would be the most appropriate abatement for 58 of the 60 trees with risk ratings of 7 or greater. Trees in this group were poor condition and/or overmature in development, often with poor crown form and structure. Coast live oak #80 and Lombardy poplar #41 could be pruned to abate the risk of failure.

Appraisal of Value

To establish the value of the surveyed trees, I employed the standard methods found in *Guide for Plant Appraisal*, 9th edition (published in 2000 by the International Society of Arboriculture, Champaign IL). In addition, I referred to *Species Classification and Group Assignment* (2004), a publication of the Western Chapter of the International Society of Arboriculture (Orange CA). These two documents outline the methods employed in tree appraisal.

The value of landscape trees is based upon four factors: size, species, condition and location. Size is measured as trunk diameter at 54" above grade. The species factor considers the adaptability and appropriateness of the plant in the Oakland area. The *Species Classification and Group Assignment* lists recommended species ratings and evaluations and I used those ratings. Condition reflects tree health and structural integrity.

Table 3. Tree Risk Assessment. Lake Merritt Area. Oakland CA. Note: only ratings of 7 or greater are presented.

Tree No.	Species	Target	Most likely failure	Overall rating (range: 3 to 12)
12th Street				
83	Calif. incense cedar	12 St.	Whole tree	10
89	Blackwood acacia	12 St.	Branch	9
2	Monterey pine	14 Ave.	Branch	9
14	Monterey pine	12 St.	Branch	9
94	Monterey pine	Overpass	Branch	9
168	Monterey pine	Neighboring landscaping	Whole tree	9
252	Monterey pine	Path	Branch	8
85	Calif. incense cedar	12 St.	Stem	8
157	Calif. incense cedar	14 St	Stem	8
1002	Calif. incense cedar	12 St.	Stem	8
1004	Calif. incense cedar	12 St.	Branch	8
107	Monterey pine	Overpass	Stem	8
98	Pittosporum	Overpass	Branch	8
100	Calif. incense cedar	Overpass	Stem	8
161	Calif. incense cedar	12 St	Stem	8
20	Blackwood acacia	12 St	Stem	8
80	Coast live oak	12 St.	Stem	8
155	Calif. incense cedar	12 St / overpass	Branch	7
169	Calif. incense cedar	Path	Whole tree	7
202	Calif. incense cedar	Path	Whole tree	7
88	Coast live oak	12 St.	Branch	7
68	Flax-leaf paperbark	Path	Stem	7
69	Flax-leaf paperbark	Path	Stem	7
21	Flowering cherry	Parking lot	Whole tree	7
55	Flowering cherry	Parking lot	Branch	7
280	Monterey cypress	Path	Branch	7
6	Monterey pine	14 Ave.	Branch	7
8	Bailey acacia	14 Ave.	Branch	7
99	Pittosporum	Overpass	Branch	7
82	Red ironbark	Playground	Stem	7
43	Southern magnolia	Parking lot	Branch	7
44	Southern magnolia	Parking lot	Branch	7
114	Sweetgum	International Blvd.	Branch	7
115	Sweetgum	International Blvd.	Branch	7
42	Southern magnolia	Parking lot	Branch	7
46	Southern magnolia	Parking lot	Branch	7

Table 3, continued. Tree Risk Assessment. Lake Merritt Area. Oakland CA. Note: only ratings of 7 or greater are presented.

Tree No.	Species	Target	Most likely failure	Overall rating (range: 3 to 12)
Boat House				
48	Southern magnolia	Parking lot	Branch	7
116	Sweetgum	1st Street	Branch	7
17	Crabapple	Lawn	Whole tree	7
42A	Monterey pine	Drive	Branch	7
Channel				
11	Monterey pine	Sidewalk	Branch	10
27	Monterey pine	Path	Whole tree	9
14	Monterey pine	Parking lot	Whole tree	8
37	Lombardy poplar	Parking / sidewalk.	Stem	8
13	Monterey pine	Parking / sidewalk	Branch	8
4	Monterey pine	Path	Whole tree	8
3	Coast redwood	Path	Whole tree	7
39	Lombardy poplar	Landscape	Stem	7
43	Lombardy poplar	Access road	Stem	7
26	Monterey pine	Parking lot	Branch	7
41	Lombardy poplar	Access road	Stem	7
1	Monterey pine	Path	Branch	7
Lakeshore				
79	Blackwood acacia	Sidewalk	Whole tree	10
91	Monterey pine	Lawn	Branch	9
99	Monterey pine	Path	Branch	8
108	Blue gum	Sidewalk	Stem	8
78	Blackwood acacia	Lawn	Whole tree	7
110	Red flowering gum	Path	Branch	7
62	Chinese elm	Walkway	Branch	7

The location factor considers the site, placement and contribution of the tree in the surrounding landscape. In this case, the trees were located in the downtown area of Oakland, in either street or landscape settings. They provided shade and visual appeal.

Using the methods described above, I established the value of the 263 living trees to be $371,950. This total is based on 161 trees in the 12th Street area with a value of $273,150; 19 trees in Boat House area with a value of $28,900; 58 trees in the Channel area with a value of $45,500 and 25 trees in the Lakeshore area with a value of $24,400.

Assessment of Environmental & Economic Benefits

Urban trees are recognized as providing a range of environmental and economic benefits to a community. The question has long been: what is the value of these benefits? Scientists at the USDA Forest Service's Pacific Southwest Research Station have been at the leading edge of addressing this question. Their research has produced a computer application that uses tree inventory data to quantify the structure, function, value and management needs (http://www.itreetools.org/street_trees/introduction_step1.shtm). STRATUM (Street Tree Management Tool for Urban Forest Managers) was designed to assess populations of street trees.

The computer application, STRATUM, uses tree inventory data to quantify the annual benefits provided by trees with respect to:

- **Energy conservation** due to reduced natural gas used in winter and reduced energy use (air conditioning) in summer.
- **Reductions in stormwater** runoff.
- **Improvements in air quality** through removal of air pollutants (O_3, NO_X, SO_2, PM_{10})1 and reduced emissions from power plants (NO_X, SO_2, PM_{10}, VOC). The model accounts for potential negative effects of some trees on air quality due to the emission of biogenic volatile organic compounds (these chemicals react with NO_X from human sources, such as vehicle emissions, to form O_3).
- **Sequestration of carbon dioxide** (CO_2) and reduced emissions from power plants due to reduced energy use. The model accounts for release of CO_2 as trees die and decompose.
- **Aesthetics** and other tangible and intangible benefits provided by trees as reflected in property values. The model accounts for the value of trees based on their size and species, which provide an indication of their value in the landscape.

STRATUM uses tree growth and benefit models for urban tree species in 19 national climate zones. For this project, reference data for the "California North & Central Coast" zone, Berkeley, was used along with site-specific data on species, size and numbers of trees as surveyed in this tree assessment.

[1] CO_2 – carbon dioxide; O_3 – ozone; NO_x – Nitrous oxides; SO_2 – sulfur dioxide; PM_{10} – particulate matter, 10 microns or less in diameter.

Table 4. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
1	12th St.	Washington hawthorn	7	$300
2	12th St.	Monterey pine	27	$1,150
3	12th St.	Monterey pine	13,13	$900
4	12th St.	Monterey pine	4,4,3,3,3,3	$200
5	12th St.	Japanese privet	7	$250
6	12th St.	Monterey pine	28	$1,200
7	12th St.	Flowering cherry	9	$1,050
8	12th St.	Bailey acacia	8,8,6	$200
9	12th St.	Monterey pine	9	$300
10	12th St.	Crabapple	11,10	$450
12	12th St.	Crabapple	12,10	$500
13	12th St.	Crabapple	6,5,4	$800
14	12th St.	Monterey pine	32	$1,050
15	12th St.	Crabapple	8	$650
16	12th St.	Crabapple	6,5,5,4,4	$500
17	12th St.	Coast live oak	10,10,8,7,5	$5,150
18	12th St.	Calif. incense cedar	9,7	$200
19	12th St.	Calif. incense cedar	13,12,11	$2,000
20	12th St.	Blackwood acacia	10,8,8,6,5,4	$1,400
21	12th St.	Flowering cherry	6	$150
22	12th St.	Flowering cherry	6	$500
23	12th St.	Flowering cherry	9	$1,150
25	12th St.	Flowering cherry	5	$50
26	12th St.	Flowering cherry	4	$350
27	12th St.	Flowering cherry	8	$900
28	12th St.	Flowering cherry	4	$350
29	12th St.	Flowering cherry	10	$1,400
30	12th St.	Flowering cherry	9	$1,150
31	12th St.	Flowering cherry	9	$1,150
32	12th St.	Flowering cherry	4	$350
33	12th St.	Flowering cherry	9	$1,150
34	12th St.	Flowering cherry	4	$350
35	12th St.	Flowering cherry	8	$1,250
36	12th St.	Flowering cherry	11	$2,350
37	12th St.	Flowering cherry	10	$1,950
38	12th St.	Flowering cherry	9	$1,150
39	12th St.	Flowering cherry	9	$1,150
40	12th St.	Flowering cherry	10	$1,400
41	12th St.	Southern magnolia	15	$3,250
42	12th St.	Southern magnolia	27	$10,400

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
43	12th St.	Southern magnolia	20	$4,100
44	12th St.	Southern magnolia	17	$3,000
45	12th St.	Southern magnolia	17	$4,250
46	12th St.	Southern magnolia	28	$11,150
47	12th St.	Southern magnolia	17	$2,400
48	12th St.	Southern magnolia	18	$4,650
49	12th St.	Flowering cherry	6	$750
50	12th St.	Flowering cherry	5	$550
51	12th St.	Flowering cherry	5	$500
52	12th St.	Flowering cherry	5	$550
53	12th St.	Flowering cherry	5	$400
54	12th St.	Flowering cherry	6	$500
55	12th St.	Flowering cherry	9	$500
57	12th St.	Flowering cherry	5	$250
58	12th St.	Flowering cherry	5	$550
59	12th St.	Flowering cherry	7	$700
60	12th St.	Flowering cherry	6	$750
61	12th St.	Flowering cherry	5	$550
62	12th St.	Flowering cherry	10	$1,950
63	12th St.	Flowering cherry	5	$550
64	12th St.	Flowering cherry	5	$500
65	12th St.	Flowering cherry	5	$550
66	12th St.	Flowering cherry	5	$500
67	12th St.	Flowering cherry	6	$650
68	12th St.	Flax-leaf paperbark	15,10	$2,850
69	12th St.	Flax-leaf paperbark	13,10	$1,550
72	12th St.	Calif. incense cedar	10	$1,100
73	12th St.	Calif. incense cedar	14	$1,200
74	12th St.	Calif. incense cedar	9,8	$1,150
75	12th St.	Pittosporum	6,6,5,5,4,3,3,2	$1,500
76	12th St.	Pittosporum	6,6,5,5,4,3,3,2	$1,500
77	12th St.	Pittosporum	6,6,5,4,4,2,2,2	$1,300
78	12th St.	Pittosporum	5,5,5,4,4,3,3,2,2,2	$1,300
79	12th St.	Pittosporum	6,6,6,4,4,3,3,2,2,2	$1,650
80	12th St.	Coast live oak	18,12	$6,050
81	12th St.	Southern magnolia	4,4	$400
82	12th St.	Red ironbark	22,17,14	$2,200
84	12th St.	Monterey pine	21	$1,150
85	12th St.	Calif. incense cedar	20,16	$2,000
88	12th St.	Coast live oak	11,7,6	$1,350
89	12th St.	Blackwood acacia	18	$650

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
90	12th St.	Crabapple	8,6	$400
92	12th St.	Crabapple	6,5	$100
93	12th St.	Monterey pine	3,2,1	$50
94	12th St.	Monterey pine	18,17,16	$1,350
96	12th St.	Pittosporum	7,7,7	$1,350
97	12th St.	Pittosporum	7,6,5	$800
98	12th St.	Pittosporum	7	$300
99	12th St.	Pittosporum	10,8	$1,500
100	12th St.	Calif. incense cedar	13,12,11	$3,300
101	12th St.	Calif. incense cedar	21	$3,350
102	12th St.	Calif. incense cedar	7	$700
103	12th St.	Calif. incense cedar	21,5	$1,400
104	12th St.	Monterey pine	34	$2,900
105	12th St.	Monterey pine	21	$450
106	12th St.	Monterey pine	18,17,16	$1,350
107	12th St.	Monterey pine	14,14,12,9	$950
108	12th St.	Flowering cherry	4,2,2,1	$250
112	12th St.	Sweetgum	15	$1,650
113	12th St.	Sweetgum	11	$900
114	12th St.	Sweetgum	13	$1,250
115	12th St.	Sweetgum	11	$900
116	12th St.	Sweetgum	15	$2,900
120	12th St.	Southern magnolia	10	$450
121	12th St.	Southern magnolia	18	$6,650
122	12th St.	Southern magnolia	15	$3,250
123	12th St.	Southern magnolia	11	$1,100
127	12th St.	Southern magnolia	10,6	$2,000
128	12th St.	Flowering cherry	10	$1,400
129	12th St.	Southern magnolia	2	$100
130	12th St.	Southern magnolia	18	$2,650
131	12th St.	Flowering cherry	9	$1,150
139	12th St.	Yew	8,6,6,5,5,4,4,3,3,3	$4,250
145	12th St.	Canary Island pine	21	$6,300
146	12th St.	Canary Island pine	19	$5,200
147	12th St.	Blackwood acacia	17,13,12,8,6	$900
148	12th St.	Blackwood acacia	21,16,12,8	$2,000
153	12th St.	Victorian box	2,1,1,1,1	$50
154	12th St.	Victorian box	5,4,4,3,3,2,1	$1,150
155	12th St.	Calif. incense cedar	24	$2,600
157	12th St.	Calif. incense cedar	20,18,15	$4,300
157.1	12th St.	Canary Island pine	17	$4,250

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
159	12th St.	Coast live oak	4,2,2,1	$300
160	12th St.	Calif. incense cedar	28	$1,200
161	12th St.	Calif. incense cedar	14,11	$2,400
162	12th St.	Calif. incense cedar	14	$300
164	12th St.	Calif. incense cedar	20	$1,800
165	12th St.	Calif. incense cedar	20,9	$750
166	12th St.	Calif. incense cedar	22	$2,200
167	12th St.	Calif. incense cedar	17	$450
168	12th St.	Monterey pine	40	$1,500
169	12th St.	Calif. incense cedar	7,6	$250
170	12th St.	Calif. incense cedar	17	$1,300
171	12th St.	Calif. incense cedar	7	$150
172	12th St.	Calif. incense cedar	13	$1,300
173	12th St.	Calif. incense cedar	11	$200
174	12th St.	Calif. incense cedar	17	$1,750
200	12th St.	Calif. incense cedar	12	$1,550
201	12th St.	Coast redwood	18	$2,550
202	12th St.	Calif. incense cedar	17	$900
203	12th St.	Coast redwood	24,19,9	$6,300
204	12th St.	Coast redwood	9,9,8,6,5,4	$2,300
205	12th St.	Blackwood acacia	9,8,6,4	$400
206	12th St.	Coast redwood	14,11,6	$3,850
207	12th St.	Coast redwood	15	$1,450
211	12th St.	Ginkgo	9	$1,750
212	12th St.	Canary Island pine	20	$5,750
213	12th St.	Crabapple	13	$700
214	12th St.	Purpleleaf plum	13	$1,000
251	12th St.	Coast redwood	18	$3,750
253	12th St.	Coast redwood	19	$4,250
256	12th St.	Cordyline	14	$550
258	12th St.	Trident maple	13,12,10,10,9	$11,200
276	12th St.	Flowering cherry	9	$950
280	12th St.	Monterey cypress	16	$1,000
1000	12th St.	Calif. incense cedar	7,5	$100
1001	12th St.	Calif. incense cedar	8	$300
1002	12th St.	Calif. incense cedar	24,12	$3,250
1003	12th St.	Calif. incense cedar	15,13,10,5	$3,950
1004	12th St.	Calif. incense cedar	20	$1,800
9	Boat house	Weeping willow	17	$750
14	Boat house	Weeping willow	15	$250

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
15	Boat house	Weeping willow	17	$750
16	Boat house	Crabapple	12,7	$750
17	Boat house	Crabapple	10,6	$250
18	Boat house	Austr. brush cherry	17,12	$2,000
19	Boat house	Austr. brush cherry	15,12	$1,700
20	Boat house	Victorian box	8,7,5	$1,600
21	Boat house	Austr. brush cherry	16	$1,150
22	Boat house	Hollywood juniper	12,8,6	$1,100
24	Boat house	Weeping willow	19	$400
25	Boat house	Weeping willow	17	$1,050
26	Boat house	Australian tea tree	15	$2,400
28	Boat house	Australian tea tree	10	$900
29	Boat house	Victorian box	7,7,7	$2,000
30	Boat house	Victorian box	14,14	$5,400
11A	Boat house	Australian tea tree	10,10	$1,700
21A	Boat house	Austr. brush cherry	12	$550
42A	Boat house	Monterey pine	43	$4,200
1	Channel	Monterey pine	37	$3,100
2	Channel	Coast redwood	13,12	$1,950
3	Channel	Coast redwood	22	$1,500
4	Channel	Monterey pine	25	$850
5	Channel	Japanese privet	7	$150
6	Channel	Japanese privet	10	$200
7	Channel	Coast redwood	16	$550
8	Channel	Coast redwood	17	$1,500
9	Channel	Japanese privet	6	$100
10	Channel	Japanese privet	8	$200
11	Channel	Monterey pine	37	$0
12	Channel	Monterey pine	33	$1,100
13	Channel	Monterey pine	24,24,15	$1,400
14	Channel	Monterey pine	13	$50
15	Channel	Evergreen ash	12	$250
16	Channel	Evergreen ash	12	$250
17	Channel	Evergreen ash	14	$200
18	Channel	Boxelder	14	$350
19	Channel	Coast live oak	12	$1,050
20	Channel	Coast live oak	14	$1,700
21	Channel	Boxelder	13	$200
22	Channel	Boxelder	12	$250

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
23	Channel	Boxelder	13	$200
24	Channel	Boxelder	10	$200
25	Channel	Coast live oak	12	$1,050
26	Channel	Monterey pine	36	$1,300
27	Channel	Monterey pine	26	$450
28	Channel	Boxelder	18	$350
29	Channel	Boxelder	15	$250
30	Channel	Boxelder	12	$250
31	Channel	Lombardy poplar	19	$650
32	Channel	Lombardy poplar	14,11,6,4,4	$650
33	Channel	Holly oak	6,4,2	$500
34	Channel	Lombardy poplar	10,6,6	$300
35	Channel	Holly oak	6	$450
36	Channel	Lombardy poplar	15	$400
37	Channel	Lombardy poplar	18,10	$450
38	Channel	Coast live oak	4,4,3	$250
39	Channel	Lombardy poplar	22,19,12,8	$650
40	Channel	Lombardy poplar	12,10	$450
41	Channel	Lombardy poplar	14,13,12	$900
42	Channel	Lombardy poplar	13,12	$550
43	Channel	Lombardy poplar	12,10,7	$200
44	Channel	Lombardy poplar	15,10,5	$250
45	Channel	Lombardy poplar	12	$250
46	Channel	Lombardy poplar	13,11,10,7	$750
47	Channel	Lombardy poplar	12	$250
48	Channel	Lombardy poplar	14,13	$500
49	Channel	Lombardy poplar	10,9,9,5	$400
50	Channel	Lombardy poplar	12	$250
51	Channel	Lombardy poplar	9	$150
52	Channel	Lombardy poplar	15,9	$550
53	Channel	Lombardy poplar	23	$900
54	Channel	Lombardy poplar	17	$700
55	Channel	London plane	9	$850
56	Channel	Nichol's gum	22	$5,150
57	Channel	Nichol's gum	22	$5,150
58	Channel	Evergreen ash	10,5,2	$350
59	Channel	Flax-leaf paperbark	10,9	$1,700
47	Lakeshore	Calif. incense cedar	27	$4,400
62	Lakeshore	Chinese elm	19	$4,600
66	Lakeshore	Horse chestnut	4	$150

Table 4, continued. Appraisal of Value. Lake Merritt Area. Oakland CA.

Tree No.	Location	Species	Trunk Diameter	Appraised Value
69	Lakeshore	Flowering cherry	6,5,5,4	$200
74	Lakeshore	Bigleaf maple	3	$0
78	Lakeshore	Blackwood acacia	34	$750
79	Lakeshore	Blackwood acacia	35	$1,550
84	Lakeshore	Bigleaf maple	2	$50
91	Lakeshore	Monterey pine	33	$2,200
92	Lakeshore	Bottlebrush	5,5,2	$550
99	Lakeshore	Monterey pine	41	$800
100	Lakeshore	Bottlebrush	2,1	$100
102	Lakeshore	Monterey pine	30	$950
105	Lakeshore	Red oak	3	$100
106	Lakeshore	Honeylocust	5	$100
107	Lakeshore	Honeylocust	5	$50
108	Lakeshore	Blue gum	81	$2,050
110	Lakeshore	Red flowering gum	38	$2,950
111	Lakeshore	Fern pine	9	$1,500
35ae	Lakeshore	Flowering cherry	6	$350
35be	Lakeshore	Flowering cherry	5	$150
35de	Lakeshore	Flowering cherry	5	$50
35ee	Lakeshore	Flowering cherry	5	$350
35fe	Lakeshore	Flowering cherry	6	$350
35ge	Lakeshore	Flowering cherry	4	$100

In using STRATUM, I made the following assumptions about species growth and mortality, trunk diameter, condition and location for each group of trees:

1. **The 264 trees proposed for removal at the four project locations.** I used the species, diameter and condition information from the field survey (see ***Tree Survey Forms***). For multiple stem trees, I calculated the total cross-sectional area of all stems, then used the equivalent single trunk diameter.

2. **The 521 trees scheduled to be planted as part of the new landscape.** Tree species, quantities and stock sizes were obtained using proposed landscape plans for each of the three areas to be replanted. I established the trunk diameter by using the *Species Classification & Group Assignment* published by the Western Chapter International Society of Arboriculture. There are two editions of this document. The first (1992) provides average trunk diameters for 48" box nursery stock; the second (2004) covers 24" box size. I assumed that trees planted as 15 gal. would have a trunk diameter of 1". I assumed that all 521 trees would be in the good condition at planting.

3. **Trees from #2, five years after planting.** Using the group of 521 trees from #2, I assumed a 1% mortality rate over the four years following planting. This resulted in 500 trees. I selected individual trees to "die" based on my knowledge of species ease of transplanting and overall performance in the landscape. I assumed that all trees would be the size of 48" box trees by this time. Where trees larger than 48" box were specified, I increased the trunk diameter proportionally. I also assumed that the condition of well-adapted species would be consist of 60% good, 30% fair and 10% poor. In contrast, condition of less-well adapted species would be 30% good, 60% fair and 10% poor.

4. **Trees from #3, 20 years after planting.** Using the 500 trees from #3, I assumed an overall mortality of 10% from year 5 to year 20, resulting in a population of 450 trees at year 20. I assumed that fast-growing species would be three times the size of a 48" box tree while slow-growing species would be twice the size. I used the same proportions of good, fair and poor described above.

For purposes of comparison, the computer application assigns dollar values to the energy savings, air quality effects, stormwater benefits, CO_2 reduction, aesthetics, and other benefits provided for each tree species based on its size. Based on these factors, STRATUM was used to assess the "value" of the trees that would be removed (impacts) and the "value" of the new trees at planting and after 5 and 20 years of growth (benefits). The results of the tree assessment and STRATUM computer application are located in Attachment A and summarized in Table 5.

Based on STRATUM's analysis, the existing 264 trees proposed for removal provide an estimated $29,438 in annual benefits. This total represents gross benefits, as the costs associated with tree maintenance activities were not considered. The most important benefits are in the areas of aesthetics ($22,866) and energy conservation ($4,993). The existing trees have a negative effect on air quality due to the emission of biogenic volatile organic compounds.

At planting, the 521 new trees identified in the proposed landscape plans would provide an estimated $22,986 in annual benefits. This total is almost entirely due to aesthetic and other benefits, rather than environmental services such as energy savings. As the trees mature, however, the value of their annual benefits increases to $33,193 at 5 years and $40,700 at 20 years. At both time periods, the most important benefits are associated with aesthetic factors and energy conservation.

The values at 5 and 20 years include an assumed tree survival factor of about 96%, that is, about three to four trees of every 100 trees planted are assumed to die each year over the lifetime of the project (and would not be replaced). This is probably a conservative assumption (i.e., the survival factor would probably be greater) because some trees would be replaced over the life of the project (including those covered by any warranty during the first year of growth). A similar percentage of existing trees—or more likely a higher percentage because of their age and condition—would die during the 5- and 20-year time periods if not removed as part of the project.

Table 5. STRATUM Results. Summary of Annual Benefits: Existing Trees & Proposed NewTrees at Planting, 5 years & 20 years, Lake Merritt Area. Oakland CA.

	No. Of Trees	Annual benefits ($)					
		Energy savings	CO2 removal	Air quality	Storm-water runoff	Aesthe-tic/ other	Total
Existing trees	264	4,993	536	-546	1,590	22,866	29,438
New trees....							
at planting	521	575	44	-75	118	22,324	22,986
at 5 years	500	2,596	188	-191	491	30,109	33,193
at 20 years	450	7,206	632	-80	1,718	31,224	40,700

Evaluation of Project Impacts

Appropriate tree retention develops a practical match between the location and intensity of construction activities and the quality and health of trees. The results of the general and individual tree surveys were the reference points for tree condition and quality. The following plans were provided for each of the four project areas:

- **12th Street Reconstruction.** Site plan. Plans indicated the proposed improvements within the project area including realigned roads and new parking lot configuration. Limits of grading were not provided. Tree trunks were located. Canopy outlines were not included.

- **Boat House.** Site plan prepared by Wallace, Roberts & Todd (March 2006). Plans indicated the proposed improvements within the project area including new entry and other landscape improvements. Limits of grading were not provided. Tree trunks were not located; canopy outlines were representational.

- **Channel area.** Preliminary Tree Inventory prepared by Golden Associates (undated). Plans indicated the location and proposed action for each tree. Grading information was not included on this plan. Tree trunks were not located; canopies were representational.

- **Lakeshore.** Site plan prepared by Wallace, Roberts & Todd (March 2006). Plan indicated the proposed landscape improvements. Limits of grading were not provided. Tree trunks were not located; canopy outlines were representational.

Impacts to trees could occur in a variety of ways. First, demolition of existing infrastructure such as retaining wall, roads, overcrossings, structures and pavement may directly damage tree roots and crowns. Grading and other construction activities may also damage trees, through both direct mechanical injury and indirectly by altering drainage. Finally, landscape renovations may also damage trees.

- **12th Street Reconstruction.** The existing streetscape for 12th and 14th Streets would be completely demolished and reconstructed. The lake edge would be relocated further west. Existing streets would be combined into one thoroughfare. As a result, the parking lot for the Kaiser Auditorium would be narrowed and reconfigured. This section of the project essentially removes all existing infrastructure between the current lake edge and the middle of the Kaiser Auditorium parking lot. As a result, all trees within this area would be removed.

  In addition, the north side of the channel in the area south of the Auditorium would be re-graded and enlarged. The existing steep slope near the edge of the bank would be removed, necessitating removal of the row of coast redwood, California incense cedar and Monterey pines trees.

  Based on my assessment of project plans, only Washington hawthorn #1 appeared to be outside areas proposed for construction. All others trees would be impacted by the project.

- **Boat House.** The project involves renovation of the structure itself, and improvement of the access and utilities associated with it. The retaining wall at the edge of the lake would be removed and replaced. A new pedestrian entry would be created by directly linking the Boat House to Lakeside Drive. Access to a new parking area from Lakeside Drive would be constructed. All trees in the area would be impacted by the project.

- **Channel area.** The most significant impacts arise from two sources. First, the existing shoreline would be increased in area and re-graded. Second, the overcrossing at 7th and 10th Streets would be demolished and reconstructed. As a result, any trees in proximity to these changes would be significantly impacted.

  All of the trees surveyed in the Channel area would be impacted by construction.

- No major development activities were planned for the **Lakeshore Avenue** section of the project.

Impacts from the proposed projects were assessed for each tree (Table 6).

Table 6. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
12th Street			
1	Washington hawthorn	--	Outside graded area?
2	Monterey pine	Impacted by project; poor condition	Within graded area; new street
3	Monterey pine	Impacted by project	Within graded area; new street
4	Monterey pine	Impacted by project	Within graded area; new street
5	Japanese privet	Impacted by project	Within graded area; new street
6	Monterey pine	Impacted by project; poor condition	Within graded area; new street
7	Flowering cherry	Impacted by project	Within graded area; new street
8	Bailey acacia	Impacted by project	Within graded area; new sidewalk
9	Monterey pine	Impacted by project	Within graded area; new street
10	Crabapple	Impacted by project; poor condition	Within graded area; new street
11	Crabapple	--	Outside graded area; dead
12	Crabapple	Impacted by project; poor condition	Within graded area; new street
13	Crabapple	Impacted by project	Within graded area; new street
14	Monterey pine	Impacted by project; poor condition	Within graded area; new street
15	Crabapple	Impacted by project	Within graded area; new street
16	Crabapple	Impacted by project; poor condition	Within graded area; new street
17	Coast live oak	Impacted by project	Within graded area; new street
18	Calif. incense cedar	Impacted by project; poor condition	Within graded area; new street
19	Calif. incense cedar	Impacted by project; poor condition	Within graded area; new street
20	Blackwood acacia	Impacted by project	Within graded area; new street
21	Flowering cherry	Impacted by project	Within graded area
22	Flowering cherry	Impacted by project; poor condition	Within graded area
23	Flowering cherry	Impacted by project	Within graded area
25	Flowering cherry	Impacted by project; poor condition	Within graded area; new parking lot
26	Flowering cherry	Impacted by project	Within graded area; new parking lot
27	Flowering cherry	Impacted by project	Within graded area
28	Flowering cherry	Impacted by project	Within graded area
29	Flowering cherry	Impacted by project	Within graded area
30	Flowering cherry	Impacted by project	Within graded area
31	Flowering cherry	Impacted by project	Within graded area
32	Flowering cherry	Impacted by project	Within graded area; new parking lot

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
33	Flowering cherry	Impacted by project	Within graded area; new parking lot
34	Flowering cherry	Impacted by project	Within graded area
35	Flowering cherry	Impacted by project	Within graded area
36	Flowering cherry	Impacted by project	Within graded area
37	Flowering cherry	Impacted by project	Within graded area
38	Flowering cherry	Impacted by project	Within graded area; new parking lot
39	Flowering cherry	Impacted by project	Within graded area; new parking lot
40	Flowering cherry	Impacted by project	Within graded area; new parking lot
41	Southern magnolia	Impacted by project	Within graded area; new street
42	Southern magnolia	Impacted by project	Within graded area; new street
43	Southern magnolia	Impacted by project	Within graded area
44	Southern magnolia	Impacted by project	Within graded area
45	Southern magnolia	Impacted by project	Within graded area
46	Southern magnolia	Impacted by project	Within graded area
47	Southern magnolia	Impacted by project	Within graded area
48	Southern magnolia	Impacted by project	Within graded area; new parking lot
49	Flowering cherry	Impacted by project	Within graded area; new street
50	Flowering cherry	Impacted by project	Within graded area; new street
51	Flowering cherry	Impacted by project	Within graded area; new street
52	Flowering cherry	Impacted by project	Within graded area
53	Flowering cherry	Impacted by project	Within graded area
54	Flowering cherry	Impacted by project	Within graded area; new parking lot
55	Flowering cherry	Impacted by project; poor condition	Within graded area; new parking lot
57	Flowering cherry	Impacted by project	Within graded area; new street
58	Flowering cherry	Impacted by project	Within graded area; new street
59	Flowering cherry	Impacted by project	Within graded area
60	Flowering cherry	Impacted by project	Within graded area
61	Flowering cherry	Impacted by project	Within graded area; new parking lot
62	Flowering cherry	Impacted by project	Within graded area; new parking lot
63	Flowering cherry	Impacted by project	Within graded area
64	Flowering cherry	Impacted by project	Within graded area
65	Flowering cherry	Impacted by project	Within graded area
66	Flowering cherry	Impacted by project	Within graded area; new parking lot
67	Flowering cherry	Impacted by project	Within graded area; new parking lot

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
68	Flax-leaf paperbark	Impacted by project; poor condition	Within graded area
69	Flax-leaf paperbark	Impacted by project; poor condition	Within graded area
72	Calif. incense cedar	Impacted by project	Within graded area; new street
73	Calif. incense cedar	Impacted by project	Within graded area; new street
74	Calif. incense cedar	Impacted by project	Within graded area; new street
75	Pittosporum	Impacted by project	Within graded area; new street
76	Pittosporum	Impacted by project	Within graded area; new street
77	Pittosporum	Impacted by project	Within graded area; new street
78	Pittosporum	Impacted by project	Within graded area; new street
79	Pittosporum	Impacted by project	Within graded area; new street
80	Coast live oak	Impacted by project	Within graded area; new street
81	Southern magnolia	Impacted by project	Within graded area
82	Red ironbark	Impacted by project	Within graded area
83	Calif. incense cedar	Impacted by project; dead	Within graded area
84	Monterey pine	Impacted by project	Within graded area; new street
85	Calif. incense cedar	Impacted by project; poor condition	Within graded area; new street
87	Calif. incense cedar	Impacted by project; dead	Within graded area
88	Coast live oak	Impacted by project; poor condition	Within graded area; new street
89	Blackwood acacia	Impacted by project; poor condition	Within graded area; new street
90	Crabapple	Impacted by project; poor condition	Within graded area; new street
92	Crabapple	Impacted by project; poor condition	Within graded area; new street
93	Monterey pine	Impacted by project	Within graded area; new street
94	Monterey pine	Impacted by project; poor condition	Within graded area; new street
95	Crabapple	Impacted by project; poor condition	Within graded area; new street
96	Pittosporum	Impacted by project	Within graded area
97	Pittosporum	Impacted by project	Within graded area
98	Pittosporum	Impacted by project; poor condition	Within graded area
99	Pittosporum	Impacted by project	Within graded area
100	Calif. incense cedar	Impacted by project	Within graded area
101	Calif. incense cedar	Impacted by project	Within graded area
102	Calif. incense cedar	Impacted by project	Within graded area
103	Calif. incense cedar	Impacted by project; poor condition	Within graded area
104	Monterey pine	Impacted by project	Within graded area; new street

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
105	Monterey pine	Impacted by project; poor condition	Within graded area; new street
106	Monterey pine	Impacted by project; poor condition	Within graded area; new street
107	Monterey pine	Impacted by project; poor condition	Within graded area; new street
108	Flowering cherry	Impacted by project	Within graded area; new street
112	Sweetgum	Impacted by project	Within graded area; new street
113	Sweetgum	Impacted by project	Within graded area; new street
114	Sweetgum	Impacted by project	Within graded area; new street
115	Sweetgum	Impacted by project	Within graded area; new street
116	Sweetgum	Impacted by project	Within graded area; new street
120	Southern magnolia	Impacted by project; poor condition	Within graded area; new parking lot
121	Southern magnolia	Impacted by project	Realign parking lot to retain tree?
122	Southern magnolia	Impacted by project	Within graded area; new parking lot
123	Southern magnolia	Impacted by project	Within graded area; new parking lot
127	Southern magnolia	Impacted by project	Realign parking lot to retain tree?
128	Flowering cherry	Impacted by project	Within graded area; new parking lot
129	Southern magnolia	Impacted by project; poor condition	Within graded area; new parking lot
130	Southern magnolia	Impacted by project	Within graded area; new parking lot
131	Flowering cherry	Impacted by project	Within graded area; new parking lot
139	Yew	Impacted by project	Within graded area
145	Canary Island pine	Impacted by project	Within graded area
146	Canary Island pine	Impacted by project	Within graded area
147	Blackwood acacia	Impacted by project; poor condition	Within graded area
148	Blackwood acacia	Impacted by project; poor condition	Within graded area
153	Victorian box	Impacted by project; poor condition	Within graded area
154	Victorian box	Impacted by project	Within graded area
155	Calif. incense cedar	Impacted by project; poor condition	Within graded area
157	Calif. incense cedar	Impacted by project; poor condition	Within graded area
157.1	Canary Island pine	Impacted by project	Within graded area

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
159	Coast live oak	Impacted by project	Within graded area
160	Calif. incense cedar	Impacted by project; poor condition	Within graded area
161	Calif. incense cedar	Impacted by project	Within graded area
162	Calif. incense cedar	Impacted by project; poor condition	Within graded area
164	Calif. incense cedar	Impacted by project; poor condition	Within graded area
165	Calif. incense cedar	Impacted by project; poor condition	Within graded area
166	Calif. incense cedar	Impacted by project; poor condition	Within graded area
167	Calif. incense cedar	Impacted by project; poor condition	Within graded area
168	Monterey pine	Impacted by project; poor condition	Within graded area
169	Calif. incense cedar	Impacted by project; poor condition	Within graded area
170	Calif. incense cedar	Impacted by project; poor condition	Within graded area
171	Calif. incense cedar	Impacted by project; poor condition	Within graded area
172	Calif. incense cedar	Impacted by project	Within graded area
173	Calif. incense cedar	Impacted by project; poor condition	Within graded area
174	Calif. incense cedar	Impacted by project	Within graded area
200	Calif. incense cedar	Impacted by project	Within graded area
201	Coast redwood	Impacted by project	Within graded area
202	Calif. incense cedar	Impacted by project; poor condition	Within graded area
203	Coast redwood	Impacted by project	Within graded area
204	Coast redwood	Impacted by project	Within graded area
205	Blackwood acacia	Impacted by project; poor condition	Within graded area
206	Coast redwood	Impacted by project	Within graded area
207	Coast redwood	Impacted by project	Within graded area
211	Ginkgo	Impacted by project	Within graded area
212	Canary Island pine	Impacted by project	Realign grading in this area
213	Crabapple	Impacted by project; poor condition	Within graded area
214	Purpleleaf plum	Impacted by project; poor condition	Within graded area
251	Coast redwood	Impacted by project	Within graded area
252	Monterey pine	Impacgted by project; dead	Within graded area

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
253	Coast redwood	Impacted by project	Within graded area
256	Cordyline	Impacted by project	Within graded area
258	Trident maple	Impacted by project	Realign grading in this area
276	Flowering cherry	Impacted by project	Within graded area; new parking lot
280	Monterey cypress	Impacted by project; poor condition	Within graded area
1000	Calif. incense cedar	Impacted by project; poor condition	Within graded area
1001	Calif. incense cedar	Impacted by project; poor condition	Within graded area
1002	Calif. incense cedar	Impacted by project; poor condition	Within graded area
1003	Calif. incense cedar	Impacted by project	Within graded area
1004	Calif. incense cedar	Impacted by project; poor condition	Within graded area
Boat House			
9	Weeping willow	Impacted by project	Within graded area; sidewalk
12	Blackwood acacia	Impacted by project; dead	Within graded area
14	Weeping willow	Impacted by project; poor condition	Within graded area; entry stairs
15	Weeping willow	Impacted by project	Within graded area; entry stairs
16	Crabapple	Impacted by project; poor condition	Within graded area; entry stairs
17	Crabapple	Impacted by project; poor condition	Within graded area; entry stairs
18	Austr. brush cherry	Impacted by project	Within graded area; sidewalk
19	Austr. brush cherry	Impacted by project	Within graded area; sidewalk
20	Victorian box	Impacted by project	Within graded area; sidewalk
21	Austr. brush cherry	Impacted by project	Within graded area; sidewalk
22	Hollywood juniper	Impacted by project	Within graded area; entry
24	Weeping willow	Impacted by project; poor condition	Within graded area
25	Weeping willow	Impacted by project	Within graded area; sidewalk
26	Australian tea tree	Impacted by project	Lake retaining wall
28	Australian tea tree	Impacted by project	Lake retaining wall
29	Victorian box	Impacted by project	Within graded area
30	Victorian box	Impacted by project	Within graded area
11A	Australian tea tree	Impacted by project	Within graded area; entry
21A	Austr. brush cherry	Impacted by project	Lake retaining wall
42A	Monterey pine	Impacted by project	Within graded area; parking

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
Channel			
1	Monterey pine	Impacted by project	Within graded area
2	Coast redwood	Impacted by project	Within graded area; wetland
3	Coast redwood	Impacted by project; poor condition	Within graded area; wetland sidewalk
4	Monterey pine	Impacted by project	Within graded area; wetland
5	Japanese privet	Impacted by project	Within graded area; wetland sidewalk
6	Japanese privet	Impacted by project	Within graded area; wetland
7	Coast redwood	Impacted by project; poor condition	Within graded area; wetland
8	Coast redwood	Impacted by project	Within graded area; wetland
9	Japanese privet	Impacted by project	Within graded area; wetland
10	Japanese privet	Impacted by project	Within graded area; wetland
11	Monterey pine	Impacgted by project; dead	Within graded area
12	Monterey pine	Impacted by project; poor condition	Within graded area; wetland
13	Monterey pine	Impacted by project; poor condition	Within graded area; wetland
14	Monterey pine	Impacted by project; poor condition	Within graded area; wetland
15	Evergreen ash	Impacted by project	Within graded area; wetland
16	Evergreen ash	Impacted by project	Within graded area; wetland sidewalk
17	Evergreen ash	Impacted by project; poor condition	Within graded area; wetland sidewalk
18	Boxelder	Impacted by project	Within graded area; wetland sidewalk
19	Coast live oak	Impacted by project	Within graded area; wetland sidewalk
20	Coast live oak	Impacted by project	Within graded area; wetland sidewalk
21	Boxelder	Impacted by project; poor condition	Within graded area; wetland
22	Boxelder	Impacted by project	Within graded area; wetland
23	Boxelder	Impacted by project; poor condition	Within graded area; wetland
24	Boxelder	Impacted by project	Within graded area; wetland
25	Coast live oak	Impacted by project	Within graded area; wetland
26	Monterey pine	Impacted by project; poor condition	Within graded area; wetland
27	Monterey pine	Impacted by project; poor condition	Within graded area; wetland

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
28	Boxelder	Impacted by project; poor condition	Within graded area; wetland
29	Boxelder	Impacted by project; poor condition	Within graded area; wetland
30	Boxelder	Impacted by project	Within graded area; wetland
31	Lombardy poplar	Impacted by project	Within graded area; wetland
32	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
33	Holly oak	Impacted by project	Within graded area; wetland sidewalk
34	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
35	Holly oak	Impacted by project	Within graded area; wetland
36	Lombardy poplar	Impacted by project	Within graded area; wetland
37	Lombardy poplar	Impacted by project; poor condition	Within graded area; wetland
38	Coast live oak	Impacted by project	Within graded area; wetland
39	Lombardy poplar	Impacted by project; poor condition	Within graded area; wetland
40	Lombardy poplar	Impacted by project	Within graded area; wetland
41	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
42	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
43	Lombardy poplar	Impacted by project; poor condition	Within graded area; wetland sidewalk
44	Lombardy poplar	Impacted by project; poor condition	Within graded area; wetland sidewalk
45	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
46	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
47	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
48	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
49	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
50	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
51	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
52	Lombardy poplar	Impacted by project	Within graded area; wetland sidewalk
53	Lombardy poplar	Impacted by project	Within graded area; wetland

Table 6, continued. Evaluation of Project Impacts. Lake Merritt Area. Oakland CA.

Tree No.	Species	Impacts?	Relation to Project
54	Lombardy poplar	Impacted by project	Within graded area; wetland
55	London plane	Impacted by project	7th St. overcrossing
56	Nichol's gum	Impacted by project	Within graded area
57	Nichol's gum	Impacted by project	Within graded area
58	Evergreen ash	Impacted by project	Within graded area; wetland
59	Flax-leaf paperbark	Impacted by project	Within graded area; wetland
Lakeshore			
47	Calif. incense cedar	--	Outside graded area
62	Chinese elm	--	Outside graded area
66	Horse chestnut	--	Outside graded area
69	Flowering cherry	--	Outside graded area
74	Bigleaf maple	--	Outside graded area
78	Blackwood acacia	--	Outside graded area
79	Blackwood acacia	--	Outside graded area
84	Bigleaf maple	--	Outside graded area
91	Monterey pine	--	Outside graded area
92	Bottlebrush	--	Outside graded area
99	Monterey pine	--	Outside graded area
100	Bottlebrush	--	Outside graded area
102	Monterey pine	--	Outside graded area
105	Red oak	--	Outside graded area
106	Honeylocust	--	Outside graded area
107	Honeylocust	--	Outside graded area
108	Blue gum	--	Outside graded area
110	Red flowering gum	--	Outside graded area
111	Fern pine	--	Outside graded area
35ae	Flowering cherry	--	Outside graded area
35be	Flowering cherry	--	Outside graded area
35de	Flowering cherry	--	Outside graded area
35ee	Flowering cherry	--	Outside graded area
35fe	Flowering cherry	--	Outside graded area
35ge	Flowering cherry	--	Outside graded area

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Recommendations for Action

All 269 trees surveyed had been identified for removal by the City of Oakland. It is for this reason that they were selected for additional evaluation. With few exceptions, I concur with the City's recommendations.

In developing recommendations for action for each tree, I considered the following:

- **Health & structural condition.** Ninety (90) trees were in poor condition or dead. I do not believe that any trees in poor condition could be restored. Among trees in fair condition, most possessed some significant defect in structure such as poor form and/or crown structure, a history of branch failure and dieback of twigs and branches.

- **Potential for relocation.** I identified three trees with good potential for relocation (coast live oak #80, Canary Island pine #146 and flowering cherry #35ee). Another 30 trees had moderate potential for relocation. Within this group of 30, 15 were Protected trees, mostly flowering cherries at the Kaiser Convention Center parking lot. The clear message from this analysis: the vast majority of surveyed trees were not suitable for relocation.

- **Impacts from construction.** The relationship of each tree to proposed development was evaluated using site plans. For the 12th Street, Boat House and Channel project areas, only two trees are outside areas proposed for grading and construction.

- **Risk.** The potential for each tree to fail and cause damage to property or injure a person was evaluated on a scale from 3 to 12, where 3 indicated low risk and 12 very high. Based on my evaluation, I recommend removal of all trees with risk ratings of 8 or greater in the next 12 months.

Using the four factors noted above, I developed recommendations for action for each tree and project area (Table 7).

12th Street Reconstruction

I recommend that coast live oak #80 be considered for relocation. It is in good condition, semi-mature in development and a species that can be successfully relocated.

Associated with this area of the project is re-grading and re-construction of the north side of the channel, south of the Auditorium. I recommend that grading limits be re-designed to remain outside the dripline trident maple #258. This tree is in good condition and an unusual species for the area.

In addition, I recommend that the proposed planters in the new parking lot be re-located to accommodate existing trees, southern magnolia #121 and #127. Both trees are in good condition. Because the new parking lot would be constructed at existing grade, it should be possible to retain these trees in their existing location.

I do not recommend relocation of ginkgo #211 and Canary Island pine #146. The ginkgo, while in good overall condition, has two significant defects in structure: 1) lacks a central leader in the upper crown and 2) mechanical wounds at the base of the trunk. Although I assessed the pine as having good suitability for preservation, I cannot recommend relocation. I consider this tree too large to relocate. In my view, the cost of this operation would be better spent in maintaining newly planted trees.

Boat House

I concur with the proposed removal of 21 trees in this area. All are located within areas proposed for grading and construction. The only tree in good condition, willow #25, is located within the proposed access driveway to Lakeside Drive. Given its mature condition, I cannot recommend either re-designing the entry to accommodate it or relocating elsewhere on-site.

Monterey pine #42a is a 43" tree in fair condition, located at the east end of the parking lot access to Lakeside Dr. It is overmature in development with a significant number of dead branches in the crown. Given its age, condition and the poor response of this species to construction, I cannot recommend retention.

Channel

I concur with recommendations to remove the 59 trees in the Channel project area. While most are in fair or good condition, either their proximity to infrastructure such as overcrossings and/or location within areas proposed for grading limit opportunities for preservation. In my view, none of the trees proposed for removal warrants the extensive re-design that would be required for their preservation.

Lakeshore Avenue.

I concur with the recommendation for removal of 24 trees and recommend preservation of one; flowering cherry #35ee. This tree is in good condition. A second tree in good condition, fern pine # 111, has displaced the adjacent pavement by 4". The prudent management course would be to remove this 9" tree before additional damage occurs. Given its proximity to infrastructure, the tree cannot be relocated.

Also present are 10 trees in fair condition. Each of these trees possesses some significant defect in structure. For example, California incense cedar #47 is a mature tree with dieback in the upper crown and a one-sided form. Chinese elm #62 has poor crown structure and a history of scaffold branch failure. Blackwood acacia #79 has a strong lean towards the sidewalk, parking and street, and is the process of failing at the base of the trunk. Red flowering gum #110 is in poor overall condition with a history of branch failure and decay at old pruning wounds.

Summary of Proposed Action

I recommend preservation of 5 trees and removal of 264 (Table 6). Included among trees recommended for preservation are the following:

- Coast live oak #80 (12th Street area) is located within areas proposed for grading but could be relocated elsewhere on-site.

- Trident maple #258 (both in 12th Street). Retaining this tree would require revising the proposed grading plan.

- Southern magnolias #121 and #127 are located in parking lot of the Kaiser Auditorium. Their retention would require re-design of the parking area.
- Flowering cherry #35ee is in good condition and outside areas proposed for re-development.

Among the 264 trees recommended for removal are 6 dead trees, 162 that would be impacted beyond their tolerance and 96 in either poor condition or possessing poor structure. Fern pine #111 (Lakeshore) is outside development areas but is recommended for removal due to its conflict with infrastructure.

HortScience, Inc.

James R. Clark, Ph.D.
Certified Arborist WE-0846
Registered Consulting Arborist #357

Table 7. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
12th Street				
1	Washington hawthorn	7	Remove	Poor condition
2	Monterey pine	27	Remove	Risk rating = 9. Poor condition
3	Monterey pine	13,13	Remove	Impacts from project
4	Monterey pine	4,4,3,3,3,3	Remove	Impacts from project
5	Japanese privet	7	Remove	Impacts from project
6	Monterey pine	28	Remove	Poor condition
7	Flowering cherry	9	Remove	Impacts from project
8	Bailey acacia	8,8,6	Remove	Impacts from project
9	Monterey pine	9	Remove	Impacts from project
10	Crabapple	11,10	Remove	Poor condition
11	Crabapple	--	Remove	Dead; stump
12	Crabapple	12,10	Remove	Poor condition
13	Crabapple	6,5,4	Remove	Impacts from project
14	Monterey pine	32	Remove	Risk rating = 9. Poor condition
15	Crabapple	8	Remove	Impacts from project
16	Crabapple	6,5,5,4,4	Remove	Poor condition
17	Coast live oak	10,10,8,7,5	Remove	Impacts from project
18	Calif. incense cedar	9,7	Remove	Poor condition
19	Calif. incense cedar	13,12,11	Remove	Poor condition
20	Blackwood acacia	10,8,8,6,5,4	Remove	Risk rating = 8
21	Flowering cherry	6	Remove	Impacts from project
22	Flowering cherry	6	Remove	Poor condition
23	Flowering cherry	9	Remove	Impacts from project
25	Flowering cherry	5	Remove	Poor condition
26	Flowering cherry	4	Remove	Impacts from project
27	Flowering cherry	8	Remove	Impacts from project
28	Flowering cherry	4	Remove	Impacts from project
29	Flowering cherry	10	Remove	Impacts from project
30	Flowering cherry	9	Remove	Impacts from project
31	Flowering cherry	9	Remove	Impacts from project
32	Flowering cherry	4	Remove	Impacts from project
33	Flowering cherry	9	Remove	Impacts from project
34	Flowering cherry	4	Remove	Impacts from project
35	Flowering cherry	8	Remove	Impacts from project
36	Flowering cherry	11	Remove	Impacts from project
37	Flowering cherry	10	Remove	Impacts from project
38	Flowering cherry	9	Remove	Impacts from project
39	Flowering cherry	9	Remove	Impacts from project
40	Flowering cherry	10	Remove	Impacts from project
41	Southern magnolia	15	Remove	Impacts from project
42	Southern magnolia	27	Remove	Impacts from project
43	Southern magnolia	20	Remove	Impacts from project

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
44	Southern magnolia	17	Remove	Impacts from project
45	Southern magnolia	17	Remove	Impacts from project
46	Southern magnolia	28	Remove	Impacts from project
47	Southern magnolia	17	Remove	Impacts from project
48	Southern magnolia	18	Remove	Impacts from project
49	Flowering cherry	6	Remove	Impacts from project
50	Flowering cherry	5	Remove	Impacts from project
51	Flowering cherry	5	Remove	Impacts from project
52	Flowering cherry	5	Remove	Impacts from project
53	Flowering cherry	5	Remove	Impacts from project
54	Flowering cherry	6	Remove	Impacts from project
55	Flowering cherry	9	Remove	Poor condition
57	Flowering cherry	5	Remove	Impacts from project
58	Flowering cherry	5	Remove	Impacts from project
59	Flowering cherry	7	Remove	Impacts from project
60	Flowering cherry	6	Remove	Impacts from project
61	Flowering cherry	5	Remove	Impacts from project
62	Flowering cherry	10	Remove	Impacts from project
63	Flowering cherry	5	Remove	Impacts from project
64	Flowering cherry	5	Remove	Impacts from project
65	Flowering cherry	5	Remove	Impacts from project
66	Flowering cherry	5	Remove	Impacts from project
67	Flowering cherry	6	Remove	Impacts from project
68	Flax-leaf paperbark	15,10	Remove	Poor condition
69	Flax-leaf paperbark	13,10	Remove	Poor condition
72	Calif. incense cedar	10	Remove	Impacts from project
73	Calif. incense cedar	14	Remove	Impacts from project
74	Calif. incense cedar	9,8	Remove	Impacts from project
75	Pittosporum	6,6,5,5,4,3,3,2	Remove	Impacts from project
76	Pittosporum	6,6,5,5,4,3,3,2	Remove	Impacts from project
77	Pittosporum	6,6,5,4,4,2,2,2	Remove	Impacts from project
78	Pittosporum	5,5,5,4,4,3,3,2,2,2	Remove	Impacts from project
79	Pittosporum	6,6,6,4,4,3,3,2,2,2	Remove	Impacts from project
80	Coast live oak	18,12	Relocate?	Risk rating = 8
81	Southern magnolia	4,4	Remove	Impacts from project
82	Red ironbark	22,17,14	Remove	Impacts from project
83	Calif. incense cedar	8,7	Remove	Dead. Risk rating = 10
84	Monterey pine	21	Remove	Impacts from project
85	Calif. incense cedar	20,16	Remove	Risk rating = 8. Poor condition
87	Calif. incense cedar	--	Remove	Dead; stump
88	Coast live oak	11,7,6	Remove	Poor condition
89	Blackwood acacia	18	Remove	Risk rating = 9. Poor condition

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
90	Crabapple	8,6	Remove	Poor condition
92	Crabapple	6,5	Remove	Poor condition
93	Monterey pine	3,2,1	Remove	Impacts from project
94	Monterey pine	18,17,16	Remove	Risk rating = 9. Poor condition
95	Crabapple	2,2,1	Remove	Poor condition
96	Pittosporum	7,7,7	Remove	Impacts from project
97	Pittosporum	7,6,5	Remove	Impacts from project
98	Pittosporum	7	Remove	Risk rating = 8. Poor condition
99	Pittosporum	10,8	Remove	Impacts from project
100	Calif. incense cedar	13,12,11	Remove	Risk rating = 8
101	Calif. incense cedar	21	Remove	Impacts from project
102	Calif. incense cedar	7	Remove	Impacts from project
103	Calif. incense cedar	21,5	Remove	Poor condition
104	Monterey pine	34	Remove	Impacts from project
105	Monterey pine	21	Remove	Poor condition
106	Monterey pine	18,17,16	Remove	Poor condition
107	Monterey pine	14,14,12,9	Remove	Risk rating = 8. Poor condition
108	Flowering cherry	4,2,2,1	Remove	Impacts from project
112	Sweetgum	15	Remove	Impacts from project
113	Sweetgum	11	Remove	Impacts from project
114	Sweetgum	13	Remove	Impacts from project
115	Sweetgum	11	Remove	Impacts from project
116	Sweetgum	15	Remove	Impacts from project
120	Southern magnolia	10	Remove	Poor condition
121	Southern magnolia	18	Preserve?	Realign parking lot to retain tree
122	Southern magnolia	15	Remove	Impacts from project
123	Southern magnolia	11	Remove	Impacts from project
127	Southern magnolia	10,6	Remove	Within graded area; new parking lot
128	Flowering cherry	6	Remove	Impacts from project
129	Southern magnolia	2	Remove	Poor condition
130	Southern magnolia	18	Remove	Impacts from project
131	Flowering cherry	9	Remove	Impacts from project
139	Yew	8,6,6,5,5,4,4,3,3,3	Remove	Impacts from project
145	Canary Island pine	21	Remove	Impacts from project
146	Canary Island pine	19	Remove	Impacts from project
147	Blackwood acacia	17,13,12,8,6	Remove	Poor condition
148	Blackwood acacia	21,16,12,8	Remove	Poor condition
153	Victorian box	2,1,1,1,1	Remove	Poor condition
154	Victorian box	5,4,4,3,3,2,1	Remove	Impacts from project

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
155	Calif. incense cedar	24	Remove	Poor condition
157	Calif. incense cedar	20,18,15	Remove	Risk rating = 8. Poor condition
157.1	Canary Island pine	17	Remove	Impacts from project
159	Coast live oak	4,2,2,1	Remove	Impacts from project
160	Calif. incense cedar	28	Remove	Poor condition
161	Calif. incense cedar	14,11	Remove	Risk rating = 8
162	Calif. incense cedar	14	Remove	Poor condition
164	Calif. incense cedar	20	Remove	Poor condition
165	Calif. incense cedar	20,9	Remove	Poor condition
166	Calif. incense cedar	22	Remove	Poor condition
167	Calif. incense cedar	17	Remove	Poor condition
168	Monterey pine	40	Remove	Risk rating = 9. Poor condition
169	Calif. incense cedar	7,6	Remove	Poor condition
170	Calif. incense cedar	17	Remove	Poor condition
171	Calif. incense cedar	7	Remove	Poor condition
172	Calif. incense cedar	13	Remove	Impacts from project
173	Calif. incense cedar	11	Remove	Poor condition
174	Calif. incense cedar	17	Remove	Impacts from project
200	Calif. incense cedar	12	Remove	Impacts from project
201	Coast redwood	18	Remove	Impacts from project
202	Calif. incense cedar	17	Remove	Poor condition
203	Coast redwood	24,19,9	Remove	Impacts from project
204	Coast redwood	9,9,8,6,5,4	Remove	Impacts from project
205	Blackwood acacia	9,8,6,4	Remove	Poor condition
206	Coast redwood	14,11,6	Remove	Impacts from project
207	Coast redwood	15	Remove	Impacts from project
211	Ginkgo	9	Remove	Impacts from project
212	Canary Island pine	20	Remove	Impacts from project
213	Crabapple	13	Remove	Poor condition
214	Purpleleaf plum	13	Remove	Poor condition
251	Coast redwood	18	Remove	Impacts from project
252	Monterey pine	31	Remove	Dead. Risk rating = 8
253	Coast redwood	19	Remove	Impacts from project
256	Cordyline	14	Remove	Impacts from project
258	Trident maple	13,12,10,10,9	Preserve	Realign grading in this area
276	Flowering cherry	9	Remove	Impacts from project
280	Monterey cypress	16	Remove	Poor condition
1000	Calif. incense cedar	7,5	Remove	Poor condition
1001	Calif. incense cedar	8	Remove	Poor condition
1002	Calif. incense cedar	24,12	Remove	Risk rating = 8. Poor condition

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
1003	Calif. incense cedar	15,13,10,5	Remove	Impacts from project
1004	Calif. incense cedar	20	Remove	Risk rating = 8. Poor condition
Boat House				
9	Weeping willow	17	Remove	Impacts from project
12	Blackwood acacia	--	Remove	Dead; stump
14	Weeping willow	15	Remove	Poor condition
15	Weeping willow	17	Remove	Impacts from project
16	Crabapple	12,7	Remove	Poor condition
17	Crabapple	10,6	Remove	Poor condition
18	Austr. brush cherry	17,12	Remove	Impacts from project
19	Austr. brush cherry	15,12	Remove	Impacts from project
20	Victorian box	8,7,5	Remove	Impacts from project
21	Austr. brush cherry	16	Remove	Impacts from project
22	Hollywood juniper	12,8,6	Remove	Impacts from project
24	Weeping willow	19	Remove	Poor condition
25	Weeping willow	17	Remove	Impacts from project
26	Australian tea tree	15	Remove	Impacts from project
28	Australian tea tree	10	Remove	Impacts from project
29	Victorian box	7,7,7	Remove	Impacts from project
30	Victorian box	14,14	Remove	Impacts from project
11A	Australian tea tree	10,10	Remove	Impacts from project
21A	Austr. brush cherry	12	Remove	Impacts from project
42A	Monterey pine	43	Remove	Impacts from project
Channel				
1	Monterey pine	37	Remove	Impacts from project
2	Coast redwood	13,12	Remove	Impacts from project
3	Coast redwood	22	Remove	Poor condition
4	Monterey pine	25	Remove	Risk rating = 8
5	Japanese privet	7	Remove	Impacts from project
6	Japanese privet	10	Remove	Impacts from project
7	Coast redwood	16	Remove	Poor condition
8	Coast redwood	17	Remove	Impacts from project
9	Japanese privet	6	Remove	Impacts from project
10	Japanese privet	8	Remove	Impacts from project
11	Monterey pine	37	Remove	Dead. Risk rating = 10
12	Monterey pine	33	Remove	Poor condition
13	Monterey pine	24,24,15	Remove	Risk rating = 8. Poor condition
14	Monterey pine	13	Remove	Risk rating = 8. Poor condition
15	Evergreen ash	12	Remove	Impacts from project

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
16	Evergreen ash	12	Remove	Impacts from project
17	Evergreen ash	14	Remove	Poor condition
18	Boxelder	14	Remove	Impacts from project
19	Coast live oak	12	Remove	Impacts from project
20	Coast live oak	14	Remove	Impacts from project
21	Boxelder	13	Remove	Poor condition
22	Boxelder	12	Remove	Impacts from project
23	Boxelder	13	Remove	Poor condition
24	Boxelder	10	Remove	Impacts from project
25	Coast live oak	12	Remove	Impacts from project
26	Monterey pine	36	Remove	Poor condition
27	Monterey pine	26	Remove	Risk rating = 9. Poor condition
28	Boxelder	18	Remove	Poor condition
29	Boxelder	15	Remove	Poor condition
30	Boxelder	12	Remove	Impacts from project
31	Lombardy poplar	19	Remove	Impacts from project
32	Lombardy poplar	14,11,6,4,4	Remove	Impacts from project
33	Holly oak	6,4,2	Remove	Impacts from project
34	Lombardy poplar	10,6,6	Remove	Impacts from project
35	Holly oak	6	Remove	Impacts from project
36	Lombardy poplar	15	Remove	Impacts from project
37	Lombardy poplar	18,10	Remove	Risk rating = 8. Poor condition
38	Coast live oak	4,4,3	Remove	Impacts from project
39	Lombardy poplar	22,19,12,8	Remove	Poor condition
40	Lombardy poplar	12,10	Remove	Impacts from project
41	Lombardy poplar	14,13,12	Remove	Impacts from project
42	Lombardy poplar	13,12	Remove	Impacts from project
43	Lombardy poplar	12,10,7	Remove	Poor condition
44	Lombardy poplar	15,10,5	Remove	Poor condition
45	Lombardy poplar	12	Remove	Impacts from project
46	Lombardy poplar	13,11,10,7	Remove	Impacts from project
47	Lombardy poplar	12	Remove	Impacts from project
48	Lombardy poplar	14,13	Remove	Impacts from project
49	Lombardy poplar	10,9,9,5	Remove	Impacts from project
50	Lombardy poplar	12	Remove	Impacts from project
51	Lombardy poplar	9	Remove	Impacts from project
52	Lombardy poplar	15,9	Remove	Impacts from project
53	Lombardy poplar	23	Remove	Impacts from project
54	Lombardy poplar	17	Remove	Impacts from project
55	London plane	9	Remove	Impacts from project

Table 7, continued. Proposed Action. Lake Merritt Area. Oakland CA.

Tree No.	Species	Trunk Diameter	Proposed Action	Reason
56	Nichol's gum	22	Remove	Impacts from project
57	Nichol's gum	22	Remove	Impacts from project
58	Evergreen ash	10,5,2	Remove	Impacts from project
59	Flax-leaf paperbark	10,9	Remove	Impacts from project
Lakeshore Ave				
47	Calif. incense cedar	27	Remove	Poor structure
62	Chinese elm	19	Remove	Poor structure
66	Horse chestnut	4	Remove	Poor condition
69	Flowering cherry	6,5,5,4	Remove	Poor condition
74	Bigleaf maple	3	Remove	Poor condition
78	Blackwood acacia	34	Remove	Poor condition
79	Blackwood acacia	35	Remove	Risk rating = 10. Poor condition
84	Bigleaf maple	2	Remove	Poor condition
91	Monterey pine	33	Remove	Risk rating = 9
92	Bottlebrush	5,5,2	Remove	Poor condition
99	Monterey pine	41	Remove	Risk rating = 8. Poor condition
100	Bottlebrush	2,1	Remove	Poor condition
102	Monterey pine	30	Remove	Poor condition
105	Red oak	3	Remove	Poor condition
106	Honeylocust	5	Remove	Poor condition
107	Honeylocust	5	Remove	Poor condition
108	Blue gum	81	Remove	Risk rating = 8
110	Red flowering gum	38	Remove	Poor condition
111	Fern pine	9	Remove	Conflict with infrastructure
35ae	Flowering cherry	6	Remove	Poor condition
35be	Flowering cherry	5	Remove	Poor condition
35de	Flowering cherry	5	Remove	Poor condition
35ee	Flowering cherry	5	Preserve	
35fe	Flowering cherry	6	Remove	Poor condition
35ge	Flowering cherry	4	Remove	Poor condition

Attachment A
i-Tree Outputs

Existing Conditions

Total Annual Benefits of Public Trees by Species ($)

4/22/20

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Othe	Total ($)	Standard Error	% of Total $
Kwanzan cherry	292	36	54	53	1,802	2,237	(±0)	7.6
Incense cedar	832	70	77	257	3,587	4,824	(±0)	16.4
Monterey pine	860	88	240	345	2,555	4,089	(±0)	13.9
Black poplar	422	52	151	131	2,922	3,679	(±0)	12.5
Southern magnolia	301	24	-30	107	1,204	1,606	(±0)	5.5
Common	112	17	30	21	414	593	(±0)	2.0
Coast redwood	354	34	-341	80	1,751	1,878	(±0)	6.4
Cheesewood	109	7	53	35	374	578	(±0)	2.0
Boxelder	103	12	34	34	827	1,010	(±0)	3.4
Coastal live oak;	162	19	-139	52	884	978	(±0)	3.3
Black acacia	181	35	27	78	638	958	(±0)	3.3
Ligustro	51	3	11	16	300	381	(±0)	1.3
Sweetgum	133	9	-77	24	712	800	(±0)	2.7
Victorian box	46	3	22	15	146	232	(±0)	0.8
Weeping willow	130	10	22	25	469	657	(±0)	2.2
Brush cherry	78	7	43	30	324	481	(±0)	1.6
Evergreen ash	37	5	12	13	335	401	(±0)	1.4
Canary island pine	118	10	10	36	432	606	(±0)	2.1
Coastal teatree	48	4	20	17	207	295	(±0)	1.0
Cajeput	45	4	15	18	164	247	(±0)	0.8
Other street trees	579	86	-779	199	2,821	2,908	(±0)	9.9
Citywide Total	4,993	536	-546	1,590	22,866	29,438	(±0)	100.0

Project at Initial Replacement Planting

Total Annual Benefits of Public Trees by Species ($)

4/24/20

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Othe	Total ($)	Standard Error	% of Total $
Ginkgo	127	6	-2	16	3,798	3,945	(±0)	17.2
London planetree	60	4	-7	10	3,360	3,426	(±0)	14.9
Coastal teatree	77	3	5	15	2,081	2,181	(±0)	9.5
Willow	13	2	1	3	2,289	2,307	(±0)	10.0
Arroya willow	24	2	2	5	753	786	(±0)	3.4
Coastal live oak;	65	9	-56	17	1,920	1,953	(±0)	8.5
Southern magnolia	7	0	-2	3	204	212	(±0)	0.9
Yoshino flowering	16	2	1	3	487	508	(±0)	2.2
Common	15	1	1	3	465	485	(±0)	2.1
Eastern redbud	13	1	1	2	399	416	(±0)	1.8
English oak	12	2	-9	3	705	712	(±0)	3.1
Christmasberry	27	1	2	5	731	766	(±0)	3.3
Other	5	1	0	1	850	857	(±0)	3.7
Japanese zelkova	9	1	1	3	125	140	(±0)	0.6
Red alder	3	0	0	1	523	527	(±0)	2.3
Purpleleaf plum	6	1	0	1	177	185	(±0)	0.8
Bigleaf maple	4	0	0	1	64	71	(±0)	0.3
Western redbud	5	0	0	1	155	162	(±0)	0.7
Pin oak	5	1	-4	1	329	332	(±0)	1.4
Atlas cedar	8	1	0	3	419	431	(±0)	1.9
Canary island date	36	2	-6	12	357	401	(±0)	1.7
Other street trees	39	4	-4	10	2,132	2,181	(±0)	9.5
Citywide Total	575	44	-75	118	22,324	22,986	(±0)	100.0

Project Plus Five Years of Growth

Total Annual Benefits of Public Trees by Species ($)

4/25/20

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Othe	Total ($)	Standard Error	% of Total $
Ginkgo	677	34	18	86	4,136	4,952	(±0)	14.9
London planetree	425	29	-39	76	7,181	7,672	(±0)	23.1
Coastal teatree	215	13	22	56	2,110	2,417	(±0)	7.3
Willow	239	15	17	31	2,392	2,694	(±0)	8.1
Arroya willow	133	15	19	24	1,202	1,393	(±0)	4.2
Coastal live oak;	172	21	-150	44	2,887	2,975	(±0)	9.0
Southern magnolia	79	5	-15	26	783	877	(±0)	2.6
Yoshino flowering	14	1	1	3	443	462	(±0)	1.4
Common	13	1	1	3	421	439	(±0)	1.3
Eastern redbud	12	1	1	2	376	393	(±0)	1.2
English oak	64	8	-57	17	1,273	1,305	(±0)	3.9
Christmasberry	23	1	1	5	619	648	(±0)	2.0
Other	75	5	5	10	752	847	(±0)	2.6
Japanese zelkova	22	3	4	9	275	314	(±0)	0.9
Red alder	55	3	4	7	547	616	(±0)	1.9
Purpleleaf plum	31	3	4	6	283	328	(±0)	1.0
Bigleaf maple	17	2	3	7	214	244	(±0)	0.7
Western redbud	5	0	0	1	155	162	(±0)	0.5
Pin oak	35	4	-31	9	686	703	(±0)	2.1
Atlas cedar	27	2	0	8	600	637	(±0)	1.9
Canary island date	58	3	7	25	273	366	(±0)	1.1
Hawthorn	20	2	3	4	177	205	(±0)	0.6
Other street trees	182	15	-10	35	2,324	2,545	(±0)	7.7
Citywide Total	2,596	188	-191	491	30,109	33,193	(±0)	100.0

Attachment B
Tree Survey Forms

Project Plus Twenty Years of Growth

Total Annual Benefits of Public Trees by Species ($)

4/25/20

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Othe	Total ($)	Standard Error	% of Total $
Ginkgo	1,334	76	181	213	4,585	6,389	(±0)	15.7
London planetree	1,475	125	-4	402	5,729	7,727	(±0)	19.0
Coastal teatree	392	27	92	129	2,123	2,762	(±0)	6.8
Willow	866	65	134	162	3,148	4,375	(±0)	10.7
Arroya willow	494	86	153	92	1,347	2,172	(±0)	5.3
Coastal live oak;	681	78	-574	207	3,062	3,454	(±0)	8.5
Southern magnolia	445	33	-53	151	1,786	2,362	(±0)	5.8
Eastern redbud	59	6	8	11	530	614	(±0)	1.5
Yoshino flowering	59	6	8	11	530	614	(±0)	1.5
Common	51	6	7	9	460	532	(±0)	1.3
English oak	162	18	-130	41	1,249	1,340	(±0)	3.3
Other	134	9	13	22	683	861	(±0)	2.1
Christmasberry	47	3	5	12	456	523	(±0)	1.3
Purpleleaf plum	77	11	18	14	311	431	(±0)	1.1
Red alder	173	13	27	32	630	875	(±0)	2.1
Japanese zelkova	47	6	14	18	496	581	(±0)	1.4
Canary island date	60	2	50	34	0	147	(±0)	0.4
Bigleaf maple	33	4	10	13	354	415	(±0)	1.0
Atlas cedar	116	9	5	32	555	716	(±0)	1.8
Pin oak	74	8	-59	18	568	609	(±0)	1.5
Other street trees	428	41	14	95	2,623	3,201	(±0)	7.9
Citywide Total	7,206	632	-80	1,718	31,224	40,700	(±0)	100.0

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
1	12th St.	Washington hawthorn	7	2	No	Poor form & structure; broken branches.
2	12th St.	Monterey pine	27	2	Yes. Displacing curb 2"	Large surface roots; sequoia pitch moth; pine pitch canker; dead wood to 4".
3	12th St.	Monterey pine	13,13	3	Potential. 2' from retaining wall	Codominant trunks @ base; narrow attachment; poor structure.
4	12th St.	Monterey pine	4,4,3,3,3,3	3	No	Multiple attachments @ base; one-sided.
5	12th St.	Japanese privet	7	4	No	Good tree; trunk wound.
6	12th St.	Monterey pine	28	2	Yes. Displacing curb 1"	Codominant trunks @ 10'; large surface roots; large trunk wound on N.
7	12th St.	Flowering cherry	9	4	No	Multiple attachments @ 5'; trunk bleeding.
8	12th St.	Bailey acacia	8,8,6	3	No	Multiple attachments @ 1'; hazard beam; dieback.
9	12th St.	Monterey pine	9	4	Potential. 1' from retaining wall	Crown bowed around retaining wall; good young tree.
10	12th St.	Crabapple	11,10	1	No	Codominant trunks @ 5-'; basal cavity; decay.
11	12th St.	Crabapple	--	0	--	3' stump
12	12th St.	Crabapple	12,10	1	No	Codominant trunks @ 2'; hollow trunk.
13	12th St.	Crabapple	6,5,4	3	No	Multiple attachments @ 2'; branch wounds; surface roots.
14	12th St.	Monterey pine	32	2	No	Extensive dieback; red turpentine beetle; dead wood to 10".
15	12th St.	Crabapple	8	3	Yes. Messy fruit. 1' from pavement	Codominant trunks @ 5'; one stem dead.
16	12th St.	Crabapple	6,5,5,4,4	2	No	Multiple attachments @ 2'; poor structure.
17	12th St.	Coast live oak	10,10,8,7,5	4	Potential. 5' from retaining wall	Multiple attachments @ 2'; good form; fair structure.
18	12th St.	Calif. incense cedar	9,7	1	No	Codominant trunks @ 2'; dead top.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
19	12th St.	Calif. incense cedar	13,12,11	2	No	Multiple attachments @ 3'; topped.
20	12th St.	Blackwood acacia	10,8,8,6,5,4	4	No	Multiple attachments @ base; narrow attachments; included bark.
21	12th St.	Flowering cherry	6	2	No	Serious sun scald.
22	12th St.	Flowering cherry	6	4	No	Minor sun scald.
23	12th St.	Flowering cherry	9	4	No	Asymmetric trunk.
24	12th St.	Flowering cherry	--	--	--	Removed/could not locate.
25	12th St.	Flowering cherry	5	1	No	Serious sun scald.
26	12th St.	Flowering cherry	4	5	No	Good young tree; suckering from trunk.
27	12th St.	Flowering cherry	8	4	No	Good tree
28	12th St.	Flowering cherry	4	5	No	Good young tree; suckering from trunk.
29	12th St.	Flowering cherry	10	4	No	Good tree; small crown.
30	12th St.	Flowering cherry	9	4	No	Good tree
31	12th St.	Flowering cherry	9	4	No	Good tree
32	12th St.	Flowering cherry	4	5	No	Good young tree
33	12th St.	Flowering cherry	9	4	No	Good tree
34	12th St.	Flowering cherry	4	5	No	Good young tree
35	12th St.	Flowering cherry	8	5	No	Good tree
36	12th St.	Flowering cherry	11	5	No	Good tree
37	12th St.	Flowering cherry	10	5	No	Good tree
38	12th St.	Flowering cherry	9	4	No	Leans W.; small crown.
39	12th St.	Flowering cherry	9	4	No	Leans W.; small crown.
40	12th St.	Flowering cherry	10	4	No	Good tree.
41	12th St.	Southern magnolia	15	4	Yes. Displacing curb 4"	Small crown; epicormic shoots.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
42	12th St.	Southern magnolia	27	4	Potential. 3' from retaining wall	Good tree.
43	12th St.	Southern magnolia	20	3	Potential. 3' from retaining wall	Multiple attachments @ 10; laterals.
44	12th St.	Southern magnolia	17	3	Potential. 2' from curb	Dieback; epicormic shoots.
45	12th St.	Southern magnolia	17	4	Yes. Displacing curb 2"	Epicormic shoots; branch wounds.
46	12th St.	Southern magnolia	28	4	Potential. 3' from retaining wall & pavement	Good tree; lateral to N. over parking lot.
47	12th St.	Southern magnolia	17	3	Potential. 2' from curb	Twig dieback; poor color.
48	12th St.	Southern magnolia	18	4	Potential. 3' from curb	Good tree; lateral to N. over parking lot; branch wound.
49	12th St.	Flowering cherry	6	5	No	Good young tree.
50	12th St.	Flowering cherry	5	5	No	Good young tree.
51	12th St.	Flowering cherry	5	5	No	Slight lean W.; good young tree.
52	12th St.	Flowering cherry	5	5	No	Good young tree.
53	12th St.	Flowering cherry	5	4	No	Good young tree; small crown.
54	12th St.	Flowering cherry	6	4	No	Good young tree; embedded nursery tag/tie.
55	12th St.	Flowering cherry	9	2	No	Trunk wound to 6'; mushroom on N. side of trunk @ 2'.
57	12th St.	Flowering cherry	5	3	No	Bleeding from lower trunk.
58	12th St.	Flowering cherry	5	5	No	Good young tree
59	12th St.	Flowering cherry	7	4	No	8" trunk wound.
60	12th St.	Flowering cherry	6	5	No	Good tree.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
61	12th St.	Flowering cherry	5	5	No	Good tree.
62	12th St.	Flowering cherry	10	5	No	Good tree.
63	12th St.	Flowering cherry	5	5	No	Good young tree
64	12th St.	Flowering cherry	5	5	No	Good young tree; suckering from base.
65	12th St.	Flowering cherry	5	5	No	Good young tree.
66	12th St.	Flowering cherry	5	5	No	Good young tree; small trunk wound.
67	12th St.	Flowering cherry	6	5	No	Good young tree; branch wound.
68	12th St.	Flax-leaf paperbark	15,10	2	No	Codominant trunks @ 2'; seam; trunk wound.
69	12th St.	Flax-leaf paperbark	13,10	2	No	Codominant trunks @ 1'; stems separating.
70	12th St.	Southern magnolia	--	--	--	Removed/could not locate.
72	12th St.	Calif. incense cedar	10	4	No	Slight lean E.; engulfed in blackberry.
73	12th St.	Calif. incense cedar	14	3	No	Dead top; engulfed in blackberry.
74	12th St.	Calif. incense cedar	9,8	3	No	Codominant trunks @ base; slight lean; engulfed in blackberry.
75	12th St.	Pittosporum	6,6,5,5,4,3,3,2	3	No	Multiple attachments @ base; large shrub.
76	12th St.	Pittosporum	6,6,5,5,4,3,3,2	3	No	Multiple attachments @ base; large shrub.
77	12th St.	Pittosporum	6,6,5,4,4,2,2,2	3	No	Multiple attachments @ base; large shrub.
78	12th St.	Pittosporum	5,5,5,4,4,3,3,2,2,2	3	No	Multiple attachments @ 1'; large shrub.
79	12th St.	Pittosporum	6,6,6,4,4,3,3,2,2,2	3	No	Multiple attachments @ 1'; large shrub.
80	12th St.	Coast live oak	18,12	4	No	Codominant trunks @ 2'; leans & one-sided W.; engulfed in ivy.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
81	12th St.	Southern magnolia	4,4	3	Potential. 4' from pavement	Codominant trunks @ base; low crown.
82	12th St.	Red ironbark	22,17,14	3	No	Multiple attachments @ 3'; codominant attachments higher on each stem; spreading apart.
83	12th St.	Calif. incense cedar	8,7	0	No	Engulfed in ivy; standing dead.
84	12th St.	Monterey pine	21	3	No	Engulfed in ivy; pine pitch canker; one-sided crown.
85	12th St.	Calif. incense cedar	20,16	2	No	Codominant trunks @ 4'; trunk wound where stem removed; dieback.
87	12th St.	Calif. incense cedar	--	0	--	1' stump
88	12th St.	Coast live oak	11,7,6	2	No	Engulfed in ivy; bowed N.; suppressed by #89.
89	12th St.	Blackwood acacia	18	2	No	Heavy lean N.; included bark.
90	12th St.	Crabapple	8,6	2	Yes. Messy fruit. 1' from path	Codominant trunks @ 4'; trunk wound with decay.
92	12th St.	Crabapple	6,5	1	No	Codominant trunks @ 2'; extensive trunk decay.
93	12th St.	Monterey pine	3,2,1	3	Potential. 3' from curb	Multiple attachments @ 4'; topped; poor structure.
94	12th St.	Monterey pine	18,17,16	2	Yes. Displacing retaining wall 6"	Codominant trunks @ 8'; heavy lateral limb over overpass; one stem bowed N.; girdling roots; red turpentine beetle/sequoia pitch moth.
95	12th St.	Crabapple	2,2,1	1	No	Multiple attachments @ 3'; extensive trunk decay.
96	12th St.	Pittosporum	7,7,7	3	No	Multiple attachments @ base; leans E.; shrub.
97	12th St.	Pittosporum	7,6,5	3	No	Multiple attachments @ 1'; two stems vertical, one bowed to horizontal; shrub.
98	12th St.	Pittosporum	7	2	No	Crowded; narrow crown; shrub.
99	12th St.	Pittosporum	10,8	3	No	Codominant trunks @ 4'; large shrub.
100	12th St.	Calif. incense cedar	13,12,11	3	No	Multiple attachments @ 3'; dieback.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
101	12th St.	Calif. incense cedar	21	3	No	Narrow crown; fair structure.
102	12th St.	Calif. incense cedar	7	5	No	Good young tree; a little one-sided.
103	12th St.	Calif. incense cedar	21,5	2	No	Poor form & structure; dieback.
104	12th St.	Monterey pine	34	3	No	Codominant trunks @ 10'; one-sided E.; dead wood; pine pitch canker.
105	12th St.	Monterey pine	21	2	No	Lateral @ 6'; declining.
106	12th St.	Monterey pine	18,17,16	2	No	Multiple attachments @ 3'; crowded; narrow crown.
107	12th St.	Monterey pine	14,14,12,9	2	No	Multiple attachments @ 3'; one-sided E. over overpass; large trunk wound.
108	12th St.	Flowering cherry	4,2,2,1	3	Yes. Displacing curb 1"	Multiple attachments @ 3'; fill @ base on N.
110	12th St.	Eucalyptus	--	--	--	Removed/could not locate.
112	12th St.	Sweetgum	15	3	Messy fruit	Codominant trunks @ 12'; topped @ 24'.
113	12th St.	Sweetgum	11	3	Messy fruit	Lateral over sidewalk'; topped @ 24'.
114	12th St.	Sweetgum	13	3	Messy fruit	Multiple attachments at12'; topped @ 24'.
115	12th St.	Sweetgum	11	3	Yes. Messy fruit	Codominant trunks @ 10; topped @ 24'.
116	12th St.	Sweetgum	15	4	Yes. Messy fruit. 1' from curb	Multiple attachments @ 10'; good form & structure; large surface roots.
120	12th St.	Southern magnolia	10	2	Potential. 3' from curb	Sparse crown; poor color.
121	12th St.	Southern magnolia	18	5	Yes. Displacing curb 1"	Good form & structure.
122	12th St.	Southern magnolia	15	4	Potential. 3' from curb	Trunk wound; heavy lateral limb N.
123	12th St.	Southern magnolia	11	3	Yes. Displacing curb/pavement 1"	Poor color; twig dieback; surface roots.
127	12th St.	Southern magnolia	10,6	4	Yes. Displacing curb/pavemant 2-4"	Low lateral to W. with wound/decay; twig dieback.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
128	12th St.	Flowering cherry	10	4	No	Good tree.
129	12th St.	Southern magnolia	2	4	No	Good young tree.
130	12th St.	Southern magnolia	18	3	Yes. Displacing pavemant 2"	Trunk; history of branch failure.
131	12th St.	Flowering cherry	9	4	No	Surface roots displacing curb/pavement 2".
139	12th St.	Yew	8,6,6,5,5,4,4,3,3,3	3	Potential. 1' from pavement & utility box	Multiple attachments @ 3'; good form & structure.
145	12th St.	Canary Island pine	21	4	No	Heavy lateral limbs; some branches turn up, some turn down.
146	12th St.	Canary Island pine	19	4	No	Low laterals; upright form.
147	12th St.	Blackwood acacia	17,13,12,8,6	2	No	Multiple attachments @ base; dieback; history of branch failure; engulfed in ivy.
148	12th St.	Blackwood acacia	21,16,12,8	2	No	Multiple attachments @ 1'; 16" stem separating to S.; 8" stem dead; engulfed in ivy.
149	12th St.	Calif. incense cedar	--	--	--	Removed/could not locate.
153	12th St.	Victorian box	2,1,1,1,1	2	No	Multiple attachments @ base; dieback in upper crown; engulfed in ivy.
154	12th St.	Victorian box	5,4,4,3,3,2,1	3	No	Multiple attachments @ base; shrub; engulfed in ivy.
155	12th St.	Calif. incense cedar	24	2	No	Dead wood; lateral over 12 St.
157	12th St.	Calif. incense cedar	20,18,15	2	Yes. 1' from road & retaining wall	Multiple attachments @ 3'; dead top; engulfed in ivy.
157.1	12th St.	Canary Island pine	17	4	No	Good form & structure; bleeding from trunk. Near tree #146.
159	12th St.	Coast live oak	4,2,2,1	3	Yes. 1' from road	Multiple attachments @ base; growing against road/retaining wall.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
160	12th St.	Calif. incense cedar	28	1	No	Multiple attachments @ 7'; 14" stem to N. dead; central leader with dead top.
161	12th St.	Calif. incense cedar	14,11	3	No	Codominant trunks @ 4'; one stem bowed N. over 12 St.
162	12th St.	Calif. incense cedar	14	1	No	Dead top.
164	12th St.	Calif. incense cedar	20	2	No	Dead top
165	12th St.	Calif. incense cedar	20,9	1	No	Codominant trunks @ 6'; dead top.
166	12th St.	Calif. incense cedar	22	2	No	Multiple attachments @ 6'; sparse canopy.
167	12th St.	Calif. incense cedar	17	1	No	Dead top
168	12th St.	Monterey pine	40	2	No	Codominant trunks @ 8'; partial failure; heavy lean S.; 6" hanger.
169	12th St.	Calif. incense cedar	7,6	2	No	Codominant trunks @ 3'; partial failure; leaning E.
170	12th St.	Calif. incense cedar	17	2	No	Codominant trunks @ 6'; dieback; included bark; narrow attachment.
171	12th St.	Calif. incense cedar	7	2	No	Little live material remains.
172	12th St.	Calif. incense cedar	13	3	No	Narrow crown.
173	12th St.	Calif. incense cedar	11	1	No	Dead top; declining.
174	12th St.	Calif. incense cedar	17	3	No	Topped; small crown.
200	12th St.	Calif. incense cedar	12	4	No	Good young tree; slight twist in trunk.
201	12th St.	Coast redwood	18	3	No	One-sided to channel; impacted by #202.
202	12th St.	Calif. incense cedar	17	2	No	Partial failure; leans to channel; hung-up in #201.
203	12th St.	Coast redwood	24,19,9	3	No	Multiple attachments @ base; lost top.
204	12th St.	Coast redwood	9,9,8,6,5,4	3	No	Stump sprout.
205	12th St.	Blackwood acacia	9,8,6,4	2	No	Stump sprout; included bark; weight to channel.
206	12th St.	Coast redwood	14,11,6	4	No	Multiple attachments @ base; good form & structure.
207	12th St.	Coast redwood	15	3	No	Crowded; lost top.

HORTSCIENCE TREE SURVEY

Measure DD Projects
Lake Merritt area
Oakland CA
March 2007

TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
211	12th St.	Ginkgo	9	4	No	Good form & structure; basal wounds.
212	12th St.	Canary Island pine	20	4	No	Fair structure; lateral limbs turn up; trunk wound.
213	12th St.	Crabapple	13	2	Potential. Messy fruit	Trunk & branch wounds; basal cavity; decay.
214	12th St.	Purpleleaf plum	13	3	Potential. Messy fruit	Codominant trunks @ 3'; included bark; twig dieback.
215	12th St.	Yew	--	--	--	Removed/could not locate.
251	12th St.	Coast redwood	18	4	No	Good form & structure; hanger from #252 hung-up in crown.
252	12th St.	Monterey pine	31	0	No	Dead; 8" hazard beam/hanger in crown of #251.
253	12th St.	Coast redwood	19	4	Potential. 3' from path	Narrow crown; crowded.
256	12th St.	Cordyline	14	3	No	Multiple attachments @ 7'; poor color.
258	12th St.	Trident maple	13,12,10,10, 9	4	Potential. 1' from curb	Multiple attachments @ 4'; good form & structure.
276	12th St.	Flowering cherry	9	4	No	One-sided N. away from #57.
280	12th St.	Monterey cypress	16	2	No	Half of crown dead; trunk wounds.
1000	12th St.	Calif. incense cedar	7,5	1	No	Previously unsurveyed. Codominant trunks @ 1'; dead top.
1001	12th St.	Calif. incense cedar	8	2	No	Previously unsurveyed. Codominant trunks @ 6'; one stem dead.
1002	12th St.	Calif. incense cedar	24,12	2	No	Previously unsurveyed. Multiple attachments @ 5'; dieback.
1003	12th St.	Calif. incense cedar	15,13,10,5	3	No	Previously unsurveyed. Multiple attachments @ 4'; included bark; leans S.; dieback.
1004	12th St.	Calif. incense cedar	20	2	No	Previously unsurveyed. Dead top.
9	Boat house	Weeping willow	17	3	No	Multiple attachments @ 7'; flat topped.

HORTSCIENCE TREE SURVEY

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
11	Boat house	Australian tea tree	--	--	--	Removed/could not locate.
12	Boat house	Blackwood acacia	--	0	--	3' stump.
14	Boat house	Weeping willow	15	2	No	Poor form & structure; basal cavity; decay; dead wood to 5".
15	Boat house	Weeping willow	17	3	No	Poor form & structure; small crown; surface roots; dead wood.
16	Boat house	Crabapple	12,7	2	Potential. Messy fruit	Codominant trunks @ 1'; cavity with *Ganoderma* conk.
17	Boat house	Crabapple	10,6	1	Potential. Messy fruit	Lost stem to E.; basal cavity; decay.
18	Boat house	Austr. brush cherry	17,12	3	Yes. Messy fruit. 3' from path & curb	Crowded group; soil piled @ base; twig dieback.
19	Boat house	Austr. brush cherry	15,12	3	Yes. Messy fruit. 5' from path	Crowded group; soil piled @ base; topped @ 25'.
20	Boat house	Victorian box	8,7,5	3	Yes. Messy fruit. 1' to path.	Suppressed form; trunk bowed W.
21	Boat house	Austr. brush cherry	16	3	Yes. Messy fruit. 1' from path	Crowded group; soil piled @ base; heavy lateral limb.
22	Boat house	Hollywood juniper	12,8,6	3	No	Multiple attachments @ 2'; broken branches from construction/grading.
24	Boat house	Weeping willow	19	2	No	Poor form & structure; basal cavity; decay.
25	Boat house	Weeping willow	17	4	No	Multiple attachments @ 10'; good form & structure; wounded surface roots
26	Boat house	Australian tea tree	15	3	No	One stem removed; second trunk bowed S.
28	Boat house	Australian tea tree	10	3	No	Trunk laying on ground; small crown.
29	Boat house	Victorian box	7,7,7	3	Yes. Messy fruit. 4' from driveway	Multiple attachments @ 2'; twig & branch dieback; trunk wounds.

HORTSCIENCE TREE SURVEY

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
30	Boat house	Victorian box	14,14	3	Yes. Messy fruit. 4' from driveway	Codominant trunks @ 2'; twig & branch dieback; trunk wound.
43	Boat house	Fremont cottonwood	66	3	Potential. 8' from drive & sidewalk	Lost central leader; trunk wounds; surface roots.
11A	Boat house	Australian tea tree	10,10	3	No	Trunk laying on ground; small crown.
21A	Boat house	Austr. brush cherry	12	3	Yes. Messy fruit	One-sided N.; trunk wounds; twig dieback.
42A	Boat house	Monterey pine	43	3	No	Multiple attachments @ 8'; dead wood to 4"; heavy lateral limb.
1	Channel	Monterey pine	37	4	No	Minor pine pitch canker; heavy lateral limbs W. over path.
2	Channel	Coast redwood	13,12	4	No	Codominant trunks @ base; lost tops.
3	Channel	Coast redwood	22	2	No	Sparse crown; asymmetric trunk.
4	Channel	Monterey pine	25	3	No	Twig & branch dieback; girdling root on downhill side.
5	Channel	Japanese privet	7	4	Yes. Messy fruit. 3' from sidewalk	Codominant trunks @ 5'; over topped by #4.
6	Channel	Japanese privet	10	3	Yes. Messy fruit. 3' from sidewalk	Multiple attachments @ 6'; extensive dieback.
7	Channel	Coast redwood	16	2	No	Suppressed; extensive dieback.
8	Channel	Coast redwood	17	3	Potential. 2' from retaining wall	Leans S. to channel.
9	Channel	Japanese privet	6	3	Yes. Messy fruit. 2' from sidewalk	One-sided W.
10	Channel	Japanese privet	8	4	Yes. Messy fruit. 3' from sidewalk	Engulfed in ivy.
11	Channel	Monterey pine	37	0	Yes. 3' from sidewalk	Dead; 18" stem over parking/10 St.

HORTSCIENCE TREE SURVEY

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
12	Channel	Monterey pine	33	2	Yes. 3' from retaining wall	Heavy lateral limb S.; pine pitch canker.
13	Channel	Monterey pine	24,24,15	2	No	Multiple attachments @ 3'; extensive red turpentine beetle; dead branches over parking/sidewalk.
14	Channel	Monterey pine	13	1	No	Partial failure S. over parking lot.
15	Channel	Evergreen ash	12	3	No	Multiple attachments @ 6'; one-sided W.; hanger.
16	Channel	Evergreen ash	12	3	Potential. 5' from parking lot	Multiple attachments @ 6'; one-sided S.; engulfed in ivy.
17	Channel	Evergreen ash	14	2	Potential. 5' from parking lot	One-sided E.; engulfed in ivy.
18	Channel	Boxelder	14	3	Yes. 5' from parking lot	Small, upright crown; engulfed in ivy.
19	Channel	Coast live oak	12	3	Potential. 5' from parking lot	Crown bowed E. to horizontal; engulfed in ivy.
20	Channel	Coast live oak	14	4	No	Codominant trunks @ 6'; overtopped & one-sided W.
21	Channel	Boxelder	13	2	No	Codominant trunks @ 6'; cavity in attachment.
22	Channel	Boxelder	12	3	No	One-sided W.
23	Channel	Boxelder	13	2	Yes. 5' from parking lot	Narrow crown; dead wood.
24	Channel	Boxelder	10	3	Yes. 5' from parking lot	Codominant trunks @ 6'; narrow crown.
25	Channel	Coast live oak	12	3	No	Suppressed form; bowed E. over parking lot.
26	Channel	Monterey pine	36	2	Yes. Breaking retaining wall	Heavy lateral limb E. over parking lot.
27	Channel	Monterey pine	26	2	Yes. Breaking retaining wall	Partial failure; heavy lean W. over path.

HORTSCIENCE TREE SURVEY

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
28	Channel	Boxelder	18	2	Yes. 3' from parking lot	Multiple attachments @ 6'; large trunk wound N.; lateral limb W.
29	Channel	Boxelder	15	2	Yes. 3' from parking lot	Dead wood; stubbed E.; fire damage/trunk wound S.
30	Channel	Boxelder	12	3	Yes. 3' from parking lot	Codominant trunks @ 5'; bowed E. over parking lot.
31	Channel	Lombardy poplar	19	3	Potential. Root suckers	Upright form; small laterals.
32	Channel	Lombardy poplar	14,11,6,4,4	3	Potential. Root suckers	Upright form; decay in attachment S.
33	Channel	Holly oak	6,4,2	3	Potential. 2' from sidewalk	Multiple attachments @ 1'; leans S.
34	Channel	Lombardy poplar	10,6,6	3	Yes. 1' from sidewalk	Upright form; growing against fence.
35	Channel	Holly oak	6	4	No	Codominant trunks @ 7'; growing against stump.
36	Channel	Lombardy poplar	15	3	Potential. Root suckers	Upright form; weak branch attachment; dead wood.
37	Channel	Lombardy poplar	18,10	2	Potential. Root suckers	Multiple attachments @ base; 18" stem leans N. over parking/sidewalk.
38	Channel	Coast live oak	4,4,3	3	No	Multiple attachments @ base; failed @ base & turned up; branch wound.
39	Channel	Lombardy poplar	22,19,12,8	2	Potential. Root suckers	Multiple attachments @ base; 8" stem dead.
40	Channel	Lombardy poplar	12,10	3	Potential. Root suckers	Codominant trunks @ base; dead wood.
41	Channel	Lombardy poplar	14,13,12	3	Potential. Root suckers	Multiple attachments @ base; 14" stem bowed N.

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
42	Channel	Lombardy poplar	13,12	3	Potential. Root suckers	Codominant trunks @ base; leans E.
43	Channel	Lombardy poplar	12,10,7	2	Potential. Root suckers	Multiple attachments @ base; basal cavity; stems separating.
44	Channel	Lombardy poplar	15,10,5	2	Potential. Root suckers	Codominant trunks @ 4'; extensive dieback.
45	Channel	Lombardy poplar	12	3	Potential. Root suckers	High crown; crown bowed N.west.
46	Channel	Lombardy poplar	13,11,10,7	3	Potential. Root suckers	Multiple attachments @ base; dead wood.
47	Channel	Lombardy poplar	12	3	Potential. Root suckers	Codominant trunks @ 20'; included bark.
48	Channel	Lombardy poplar	14,13	3	Potential. Root suckers	Codominant trunks @ 3'; failed @ base & turned up; dead wood.
49	Channel	Lombardy poplar	10,9,9,5	3	Potential. Root suckers	Multiple attachments @ base; crown bowed E. to channel; dead wood.
50	Channel	Lombardy poplar	12	3	Potential. Root suckers	Crowded; high crown; large surface root.
51	Channel	Lombardy poplar	9	3	Potential. Root suckers	Crowded; high crown.
52	Channel	Lombardy poplar	15,9	3	Potential. Root suckers	Codominant trunks @ base; laterals W. over access road.
53	Channel	Lombardy poplar	23	3	Potential. Root suckers	Codominant trunks @ 5'; bacterial wetwood in attachment.
54	Channel	Lombardy poplar	17	4	Potential. Root suckers	Codominant trunks @ 8'; heavy lateral limb W. over stairs.

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
55	Channel	London plane	9	5	Potential. Island planter, 2' from curb	Good young tree.
56	Channel	Nichol's gum	22	4	No	Codominant trunks @ 10'; laterals.
57	Channel	Nichol's gum	22	4	No	Leans S.'; laterals.
58	Channel	Evergreen ash	10,5,2	4	No	Multiple attachments @ 1'; surface roots.
59	Channel	Flax-leaf paperbark	10,9	3	No	Codominant trunks @ 4'; poor structure .
47	Lakeshore	Calif. incense cedar	27	3	Yes. 1' to retaining wall; 5' to pergola	One-sided crown; dead top.
62	Lakeshore	Chinese elm	19	3	Yes, grows against pergola	Codominant trunks @ 7'; narrow attachment; poor form & structure; history of branch failure.
66	Lakeshore	Horse chestnut	4	2	No	50% girdled @ base; trunk wounds.
69	Lakeshore	Flowering cherry	6,5,5,4	1	No	Basal cavity; extensive trunk decay.
74	Lakeshore	Bigleaf maple	3	2	No	Trunk wounds; 50% girdled @ base.
78	Lakeshore	Blackwood acacia	34	1	No	15' stump; *Ganoderma* conks.
79	Lakeshore	Blackwood acacia	35	2	No	Partial failure; heavy lean E. over sidewalk; mounded on tension side.
84	Lakeshore	Bigleaf maple	2	3	No	Basal wounds; fair structure.
91	Lakeshore	Monterey pine	33	3	No	Leans E.; dead wood to 6"; surface roots.
92	Lakeshore	Bottlebrush	5,5,2	3	No	Multiple attachments @ base; trunk wounds; poor form.
99	Lakeshore	Monterey pine	41	1	No	80% dead; large girdling root; red turpentine beetle.
100	Lakeshore	Bottlebrush	2,1	3	No	Codominant trunks @ base; poor form.
102	Lakeshore	Monterey pine	30	2	No	50% dead; leans E.; heavy lateral limbs.
105	Lakeshore	Red oak	3	2	No	70% girdled @ base; crown bowed to horizontal.
106	Lakeshore	Honeylocust	5	3	No	Crossing branches; poor structure; trunk & branch wounds.

HORTSCIENCE TREE SURVEY

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TREE No.	LOCATION	SPECIES	TRUNK DIAMETER (in.)	CONDITION 0=dead 1=poor 5=excellent	CONFLICTS with INFRA-STRUCTURE?	COMMENTS
107	Lakeshore	Honeylocust	5	1	No	Complete bark loss; possibly standing dead.
108	Lakeshore	Blue gum	81	3	No	Multiple attachments @ 10'; large trunk wound on E. from stem failure; trunk swollen on W.
110	Lakeshore	Red flowering gum	38	2	No	Multiple attachments @ 15'; crossing stems; topped; poor structure; history of branch failure; decay @ pruning wounds.
111	Lakeshore	Fern pine	9	4	Yes. Displacing pavement 4"	Multiple attachments @ 5'; good form & structure; in island; displacing pavement 4".
35ae	Lakeshore	Flowering cherry	6	3	No	Crown bowed S.; trunk wound.
35be	Lakeshore	Flowering cherry	5	2	No	Trunk wound; small crown.
35de	Lakeshore	Flowering cherry	5	1	No	Extensive trunk decay.
35ee	Lakeshore	Flowering cherry	5	4	No	Basal swelling.
35fe	Lakeshore	Flowering cherry	6	3	No	Basal wounds; small crown.
35ge	Lakeshore	Flowering cherry	4	2	No	Trunk wound; decay.

APPENDIX G

NOISE MODELING DATA

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (MacArthur Boulevard to El Embarcadero)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 22500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	80.8	170.6	365.9

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (El Embarcadero to Euclid Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	79.2	167.1	358.3

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: El Embarcadero (Lakeshore Avenue to Grand Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	59.6	127.3

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (MacArthur Boulevard to El Embarcader
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	64.8	135.2	289.3

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (MacArthur Boulevard to El Embarcadero)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 22500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	80.8	170.6	365.9

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (El Embarcadero to Euclid Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	79.2	167.1	358.3

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: El Embarcadero (Lakeshore Avenue to Grand Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	59.6	127.3

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (MacArthur Boulevard to El Embarcader
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	64.8	135.2	289.3

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (El Embarcadero to Boden Way)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	74.5	156.8	336.1

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Harrison Street (Grand Avenue to 20th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	105.6	208.3	439.3

TABLE Existing-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (19th Street to 20th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	67.0	140.2	300.1

TABLE Existing-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (14th Street to 17th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9000 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	93.9	199.3

TABLE Existing-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 19th Street (Lakeside Drive to Harrison Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	52.6

TABLE Existing-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Madison Street (19th Street to 17th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.86

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	81.8	174.7

TABLE Existing-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 17th Street (Madison Street to Lakeside Drive)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	0.0

TABLE Existing-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (Oak Street to Madison Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	55.9	115.5	246.3

TABLE Existing-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Oak Street to Madison Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.8	207.9

TABLE Existing-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (Oak Street to Madison Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	53.2	109.2

TABLE Existing-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (East of Oak Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	59.1	122.6	261.9

TABLE Existing-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 16th Street to Foothill Boulevard)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.15

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	81.6	166.1	353.2

TABLE Existing-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Fallon Street to Oak Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.26

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	94.5	200.7

TABLE Existing-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Oak Street (11th Street to 12th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	91.2	193.4

TABLE Existing-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 15th Street to East 14th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	58.4	123.7	265.5

TABLE Existing-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (3rd Avenue to 2nd Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	106.2	226.2

TABLE Existing-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 2nd Avenue (12th Street to 14th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	77.8	166.6

TABLE Existing-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 5th Avenue (12th Street to 14th Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	73.3	156.9

TABLE Existing-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (4th Avenue to 2nd Avenue)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	66.2	141.6

TABLE Existing-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (2nd Avenue to Fallon Street)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	66.2	141.6

TABLE Existing-25
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 8th Street (5th Avenue to Lake Merritt Channel)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	58.3	120.8	258.0

TABLE Existing-26
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Embarcadero East (5th Avenue to Lake Merritt Channel)
NOTES: - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	79.2	169.8

TABLE Existing Plus Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (MacArthur Boulevard to El Embarcadero)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	79.2	167.1	358.3

TABLE Existing Plus Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (El Embarcadero to Euclid Avenue)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.13

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	92.7	196.6	422.2

TABLE Existing Plus Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: El Embarcadero (Lakeshore Avenue to Grand Avenue)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	98.3	210.5

TABLE Existing Plus Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (MacArthur Boulevard to El Embarcader
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.16

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	69.5	145.7

TABLE Existing Plus Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (El Embarcadero to Boden Way)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	56.8	120.2	257.8

TABLE Existing Plus Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Harrison Street (Grand Avenue to 20th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	105.6	208.3	439.3

TABLE Existing Plus Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (19th Street to 20th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	65.3	139.5	300.0

TABLE Existing Plus Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (14th Street to 17th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9000 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	92.7	198.8

TABLE Existing Plus Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 19th Street (Lakeside Drive to Harrison Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	52.6

TABLE Existing Plus Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Madison Street (19th Street to 17th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.86

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	81.8	174.7

TABLE Existing Plus Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 17th Street (Madison Street to Lakeside Drive)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	0.0

TABLE Existing Plus Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (Oak Street to Madison Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	55.9	115.5	246.3

TABLE Existing Plus Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Oak Street to Madison Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.8	207.9

TABLE Existing Plus Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (Oak Street to Madison Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	53.2	109.2

TABLE Existing Plus Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (East of Oak Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	59.1	122.6	261.9

TABLE Existing Plus Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 16th Street to Foothill Boulevard)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	82.4	174.1	373.4

TABLE Existing Plus Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Fallon Street to Oak Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	93.6	200.4

TABLE Existing Plus Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Oak Street (11th Street to 12th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	91.2	193.4

TABLE Existing Plus Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 15th Street to East 14th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	82.8	175.1	375.6

TABLE Existing Plus Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (3rd Avenue to 2nd Avenue)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	106.2	226.2

TABLE Existing Plus Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 2nd Avenue (12th Street to 14th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	77.8	166.6

TABLE Existing Plus Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 5th Avenue (12th Street to 14th Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	73.3	156.9

TABLE Existing Plus Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (4th Avenue to 2nd Avenue)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	66.2	141.6

TABLE Existing Plus Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (2nd Avenue to Fallon Street)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	66.2	141.6

TABLE Existing Plus Project-25
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 8th Street (5th Avenue to Lake Merritt Channel)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	58.3	120.8	258.0

TABLE Existing Plus Project-26
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Embarcadero East (5th Avenue to Lake Merritt Channel)
NOTES: - Existing Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	79.2	169.8

TABLE Cumulative (2025) No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (MacArthur Boulevard to El Embarcadero)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	85.7	181.4	389.3

TABLE Cumulative (2025) No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (El Embarcadero to Euclid Avenue)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	86.2	182.4	391.4

TABLE Cumulative (2025) No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: El Embarcadero (Lakeshore Avenue to Grand Avenue)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 5400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	66.2	141.6

TABLE Cumulative (2025) No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (MacArthur Boulevard to El Embarcader
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	68.5	143.5	307.2

TABLE Cumulative (2025) No Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (El Embarcadero to Boden Way)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	79.0	166.6	357.2

TABLE Cumulative (2025) No Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Harrison Street (Grand Avenue to 20th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 32900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	112.0	223.2	472.0

TABLE Cumulative (2025) No Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (19th Street to 20th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	71.7	150.5	322.4

TABLE Cumulative (2025) No Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (14th Street to 17th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10000 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	100.5	213.6

TABLE Cumulative (2025) No Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 19th Street (Lakeside Drive to Harrison Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	63.5

TABLE Cumulative (2025) No Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Madison Street (19th Street to 17th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	90.2	193.0

TABLE Cumulative (2025) No Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 17th Street (Madison Street to Lakeside Drive)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	52.6

TABLE Cumulative (2025) No Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	70.9	148.9	318.9

TABLE Cumulative (2025) No Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	104.3	222.0

TABLE Cumulative (2025) No Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	74.1	155.8

TABLE Cumulative (2025) No Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (East of Oak Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	74.3	156.3	334.9

TABLE Cumulative (2025) No Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 16th Street to Foothill Boulevard)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.74

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	88.3	181.4	386.5

TABLE Cumulative (2025) No Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Fallon Street to Oak Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	99.8	212.2

TABLE Cumulative (2025) No Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Oak Street (11th Street to 12th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	99.8	212.2

TABLE Cumulative (2025) No Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 15th Street to East 14th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.05

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	72.4	154.3	331.5

TABLE Cumulative (2025) No Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (3rd Avenue to 2nd Avenue)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	56.2	116.1	247.6

TABLE Cumulative (2025) No Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 2nd Avenue (12th Street to 14th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	88.5	189.9

TABLE Cumulative (2025) No Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 5th Avenue (12th Street to 14th Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.31

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.3	209.0

TABLE Cumulative (2025) No Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (4th Avenue to 2nd Avenue)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	82.9	177.7

TABLE Cumulative (2025) No Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (2nd Avenue to Fallon Street)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	82.9	177.7

TABLE Cumulative (2025) No Project-25
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 8th Street (5th Avenue to Lake Merritt Channel)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 26300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	89.2	189.1	405.9

TABLE Cumulative (2025) No Project-26
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Embarcadero East (5th Avenue to Lake Merritt Channel)
NOTES: - Cumulative (2025) No Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 0 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	67.5	145.4	313.2

TABLE Cumulative (2025) Plus Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (MacArthur Boulevard to El Embarcadero)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	83.1	175.6	376.6

TABLE Cumulative (2025) Plus Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Grand Avenue (El Embarcadero to Euclid Avenue)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.28

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	94.8	201.3	432.2

TABLE Cumulative (2025) Plus Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: El Embarcadero (Lakeshore Avenue to Grand Avenue)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	100.9	216.2

TABLE Cumulative (2025) Plus Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (MacArthur Boulevard to El Embarcader
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.53

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	73.3	154.2

TABLE Cumulative (2025) Plus Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeshore Avenue (El Embarcadero to Boden Way)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	58.4	123.7	265.5

TABLE Cumulative (2025) Plus Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Harrison Street (Grand Avenue to 20th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn

70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	110.0	218.4	461.5

TABLE Cumulative (2025) Plus Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (19th Street to 20th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	65.0	138.9	298.8

TABLE Cumulative (2025) Plus Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Lakeside Drive (14th Street to 17th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10000 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	99.3	213.3

TABLE Cumulative (2025) Plus Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 19th Street (Lakeside Drive to Harrison Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	63.5

TABLE Cumulative (2025) Plus Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Madison Street (19th Street to 17th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	82.5	176.2

TABLE Cumulative (2025) Plus Project-11
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 17th Street (Madison Street to Lakeside Drive)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	0.0	52.6

TABLE Cumulative (2025) Plus Project-12
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	70.9	148.9	318.9

TABLE Cumulative (2025) Plus Project-13
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	104.3	222.0

TABLE Cumulative (2025) Plus Project-14
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (Oak Street to Madison Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	74.1	155.8

TABLE Cumulative (2025) Plus Project-15
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 14th Street (East of Oak Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	74.3	156.3	334.9

TABLE Cumulative (2025) Plus Project-16
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 16th Street to Foothill Boulevard)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	87.7	185.8	398.7

TABLE Cumulative (2025) Plus Project-17
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (Fallon Street to Oak Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	99.0	211.9

TABLE Cumulative (2025) Plus Project-18
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Oak Street (11th Street to 12th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	99.8	212.2

TABLE Cumulative (2025) Plus Project-19
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 1st Avenue (East 15th Street to East 14th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 26900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	90.5	192.0	412.0

TABLE Cumulative (2025) Plus Project-20
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 12th Street (3rd Avenue to 2nd Avenue)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9400 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	96.5	205.1

TABLE Cumulative (2025) Plus Project-21
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 2nd Avenue (12th Street to 14th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.77

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	77.0	165.0

TABLE Cumulative (2025) Plus Project-22
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 5th Avenue (12th Street to 14th Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.31

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	97.3	209.0

TABLE Cumulative (2025) Plus Project-23
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (4th Avenue to 2nd Avenue)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	82.9	177.7

TABLE Cumulative (2025) Plus Project-24
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 10th Street (2nd Avenue to Fallon Street)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7600 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	0.0	82.9	177.7

TABLE Cumulative (2025) Plus Project-25
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: 8th Street (5th Avenue to Lake Merritt Channel)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	92.5	196.2	421.2

TABLE Cumulative (2025) Plus Project-26
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 04/23/2007
ROADWAY SEGMENT: Embarcadero East (5th Avenue to Lake Merritt Channel)
NOTES: - Cumulative (2025) Plus Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	NIGHT
AUTOS	88.08	9.34
M-TRUCKS	1.65	0.19
H-TRUCKS	0.66	0.08

ACTIVE HALF-WIDTH (FT): 9 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

Ldn AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO Ldn			
70 Ldn	65 Ldn	60 Ldn	55 Ldn
0.0	68.0	145.5	313.0

APPENDIX H

BIOLOGICAL RESOURCES

FRIENDS OF SAUSAL CREEK
TABLE OF REPTILES, AMPHIBIANS, AND MAMMALS
THAT MAY OCCUR IN UPPER SAUSAL CREEK WATERSHED

Amphibians and reptiles of the upper Sausal Creek watershed

Common Name	Scientific Name	Habitat Type	Probability
Amphibians			
California newt	*Taricha torosa*	In or near streams in mixed-hardwood, mixed conifer	Observed
California tiger salamander	*Ambystoma tigrinum californiense*	Grassland/open woodland, requires pools or slow streams for breeding	Low
yellow-eyed salamander	*Ensatina eschscholtzii xanthopicta*	Redwood, other coniferous, mixed chaparral	High
California slender salamander	*Batrachoseps attenuatus*	Frequents nearly all habitat types	Observed
arboreal salamander	*Aneides lugubris*	Coastal live oak woodland, mixed-hardwood, redwood	Observed
western spadefoot	*Scaphiopus hammondii*	Grassland, mixed-hardwood woodlands, washes and floodplains	Low
western toad	*Bufo boreas halophilus*	Most habitats, standing water essential for reproductive success	Medium
Pacific chorus frog	*Hyla regilla*	All habitats but desert	Observed
California red-legged frog	*Rana aurora draytonii*	Highly aquatic, prefers quiet pools of streams and marshes	Low
foothill yellow-legged frog	*Rana boylii*	In or near rocky streams, mixed-hardwood, riparian, coastal scrub	Medium
Bullfrog (introduced)	*Rana catesbiana*	Highly aquatic, quiet waters with thick vegetation	Observed
Reptiles			
western pond turtle	*Clemmys marmorata*	Permanent streams or ponds in a variety of vegetation types	Observed
northwestern fence lizard	*Sceloporus occidentalis occidentalis*	All habitat types	Observed

Amphibians and reptiles of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Habitat Type	Probability
coast horned lizard	*Phrynosoma coronatum*	Open country, especially sandy areas	Low
Skilton skink	*Eumeces skiltonianus skiltonianus*	Early successional stages or open areas in a variety of habitats	Observed
western whiptail	*Cnemidophorus tigris*	Open mixed-hardwood, riparian, chaparral	Low
California alligator lizard	*Gerrhonotus multicarinatus multicarinatus*	Grassland and open canopy stages of riparian, chaparral, woodland.	Alligator lizards have been observed but not identified to species
San Francisco alligator lizard	*Gerrhonotus coeruleus coeruleus*	Grassland, woodland, forested	Alligator lizards have been observed but not identified to species
Pacific rubber boa	*Charina bottae bottae*	Usually found near streams or wet meadows in grassland, hardwood, redwood, riparian habitat	Observed
Pacific ringneck snake	*Diadophus puncatatus amabilis*	Found in open, rocky areas or moist microhabitats in a variety of habitats	Observed
sharp-tailed snake	*Contia tenuis*	Most common where conditions are somewhat moist and surface debris is present	Observed
western yellow-bellied racer	*Coluber constrictor mormon*	Common in open country, avoids densely forested habitat	Low
coachwhip	*Masticophis flagellum*	Open stages of grassland, coastal scrub, chaparral	Low
Alameda whipsnake	*Masticophis lateralis euryxanthus*	Grassland, open stages of coastal scrub and chaparral, riparian	Low
gopher snake	*Pituophis melanoleucus*	All habitat types but prefers open stages	Observed
California kingsnake	*Lampropeltis getulus californiae*	All habitats, most common in upland riparian	Medium

Amphibians and reptiles of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Habitat Type	Probability
California red-sided garter snake	*Thamnophis sirtalis infernalis*	Associated with permanent or semi-permanent water sources in a variety of habitats	High, a number of garter snakes have been observed but not identified to species
Coast garter snake	*Thamnophis elegans terrestris*	Associated with permanent or semi-permanent water sources in a variety of habitats	Observed
Santa Cruz garter snake	*Thamnophis couchii atratus*	A variety of habitats, more aquatic than other garter snakes	Medium, a number of garter snakes have been observed but not identified to species
night snake	*Hypsiglena torquata*	Grassland, chaparral, woodland, in rocky areas or rock outcrops	Medium
northern Pacific rattlesnake	*Crotalus viridis oreganus*	All habitats, prefers rocky outcrops	Observed

Birds of the upper Sausal Creek watershed. List sequence follows the 7th edition of the *American Ornithologists Union Check-List of North American Birds*.

Common Name	Scientific Name	Species Code	Abundance	Presence	Habitat
American white pelican	*Pelecanus erythrorhyncos*	AWPE	R	Cas	
double-crested cormorant	*Phalacrocorax auritus*	DCCO	U	Cas	
great blue heron	*Ardea herodias*	GBHE	U	Cas	
great egret	*Ardea albus*	GREG	U	Cas	
snowy egret	*Egretta thula*	SNEG	U	Cas	
turkey vulture	*Cathartes aura*	TUVU	C	Res	GL, CS, CH
greater white-fronted goose	*Anser albifrons*	GWFG	R	Cas	
Canada goose	*Branta canadensis*	CAGO	U	Cas	
American wigeon	*Anas americana*	AMWI	R	Cas	
mallard	*Anas platyrhychos*	MALL	U	Res	RIP
northern pintail	*Anas acuta*	NOPI	R	Cas	
white-tailed kite	*Elanus leucurus*	WTKI	R	Cas	
northern harrier	*Circus cyaneus*	NOHA	R	Cas	
sharp-shinned hawk	*Accipiter striatus*	SSHA	C	Cas	
Cooper's hawk	*Accipiter cooperi*	COHA	U	Res	RF, CS, CH, OWL
red-shouldered hawk	*Buteo lineatus*	RSHA	U	Res	RF, GL, MDW, RWF, MPF, EF
red-tailed hawk	*Buteo jamaicensis*	RTHA	C	Res	RF, GL, CH, WL, MHF, EF
golden eagle	*Aquila chrysaetos*	GOEA	R	Cas	
American kestrel	*Falco sparverius*	AMKE	R	Res	GL, WL
merlin	*Falco columbarius*	MERL	R	Cas	
peregrine falcon	*Falco peregrinus*	PEFA	R	Cas	
prairie falcon	*Falco mexicanus*	PRFA	R	Cas	
California quail	*Callipepla californica*	CAQU	U	Res	GL, CS, CH
sandhill crane	*Grus canadensis*	SACR	R	Cas	
ring-billed gull	*Larus delawarensis*	RBGU	R	Cas	
California gull	*Larus californicus*	CAGU	C	Res	UR
herring gull	*Larus argentatus*	HEGU	R	Cas	
western gull	*Larus oecidentalis*	WEGU	R	Cas	
glaucous-winged gull	*Larus glaucescens*	GWGU	R	Cas	
Caspian tern	*Sterna caspia*	CATE	R	Cas	
rock dove	*Columba livia*	RODO	A	Res	UR
band-tailed pigeon	*Columba fasciata*	BTPI	C	Res	MHF, MPF, EF
mourning dove	*Zenaida macrocoura*	MODO	C	Res	RIP, GL, WL, UR

Birds of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Species Code	Abundance	Presence	Habitat
barn owl	*Tyto alba*	BAOW	R	Cas	
western screech-owl	*Otus kennicottii*	WSOW	R	Cas	
great horned owl	*Bubo virginianus*	GHOW	C	Res	MHF, RWF, EF
northern pygmy-owl	*Glaucidium gnoma*	NPOW	R	Cas	
white-throated swift	*Aeronautes saxitilis*	WTSW	U	Cas	
Anna's hummingbird	*Calypte anna*	ANHU	A	Res	RIP, CS, CH, MHF, EF, UR
rufous hummingbird	*Selasphorus rufus*	RUHU	U	Cas	
Allen's hummingbird	*Selasphorus sasin*	ALHU	C	Jan-Sept	RIP, CS, MHF, RWF
belted kingfisher	*Ceryle alcyon*	BEKI	R	Cas	
Lewis's woodpecker	*Melanerpes lewis*	LEWO	R	Cas	
acorn woodpecker	*Melanerpes formicivorus*	ACWO	R	Cas	
Williamson's sapsucker	*Sphyrapicus thyroideus*	WISA	R	Cas	
red-breasted sapsucker	*Sphyrapicus ruber*	RBSA	R	Winter	RF, WL, MPF, UR
Nuttall's woodpecker	*Picoides nuttallii*	NUWO	C	Res	RF, MHF, MPF
downy woodpecker	*Picoides pubescens*	DOWO	C	Res	RF, MHF
hairy woodpecker	*Picoides villosus*	HAWO	C	Res	RF, MHF, MPF
northern flicker	*Colaptes aurata*	NOFL	C	Res	RF, CS, CH, MHF
pileated woodpecker	*Drycopus pileatus*	PIWO	R	Cas	
olive-sided flycatcher	*Contopus cooperi*	OSFL	C	Apr-Oct	MHF, RWF, MPF, EF
western wood-pewee	*Contopus sordidulus*	WEWP	U	Spr/Su	RF, WL, RWF, MPF, EF
willow flycatcher	*Empidonax traillii*	WIFL	R	Cas	
Pacific-slope flycatcher	*Empidonax difficilis*	PSFL	C	Mar-Oct	RF, WL, MHF
black phoebe	*Sayornis nigricans*	BLPH	C	Res	RIP, MDW
ash-throated flycatcher	*Myiarchus cinerascens*	ATFL	R	Cas	
Cassin's vireo	*Vireo cassinii*	CAVI	U	Apr-Aug	RIP, WL, MHF
Hutton's vireo	*Vireo huttonii*	HUVI	C	Res	OWL, MHF
warbling vireo	*Vireo gilvus*	WAVI	U	Mar-Oct	RF, MHF
red-eyed vireo	*Vireo olivaceus*	REVI	R	Cas	
Steller's jay	*Cyanocitta stelleri*	STJA	A	Res	RWF, MPF, EF
western scrub-jay	*Aphelocoma californica*	WSJA	A	Res	RIP, CH, WL, MHF
American crow	*Corvus brachyrhyncos*	AMCR	R	Cas	
common raven	*Corvus corax*	CORA	C	Res	MHF, RWF, MPF, EF
violet-green swallow	*Tachicyneta thalissina*	VGSW	U	Res	RIP, GL, OWL
northern rough-winged swallow	*Steglidopteryx serripennis*	NRWS	R	Spr/Su	RIP, GL,

Birds of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Species Code	Abundance	Presence	Habitat
cliff swallow	*Petrochelidon pyrrhonota*	CLSW	C	Mar-Sept	RIP, GL, OWL
chestnut-backed chickadee	*Poecile rufescens*	CBCH	C	Res	MHF, RWF, MPF, EF
oak titmouse	*Baeolophus inornatus*	OATI	C	Res	RIP, CS, OWL, MHF
common bushtit	*Psaltriparus minmus*	COBU	A	Res	RIP, CS, WL, MHF, UR
red-breasted nuthatch	*Sitta canadensis*	RBNU	C	Res	RWF, MPF
white-breasted nuthatch	*Sitta carolinensis*	WBNU	R	Cas	
pygmy nuthatch	*Sitta pygmaea*	PYNU	C	Res	MPF
brown creeper	*Certhia americana*	BRCR	C	Res	RF, MHF, RWF, EF
Bewick's wren	*Thyromanes bewickii*	BEWR	A	Res	RIP, CS, CH, MHF, UR
house wren	*Troglodytes aedon*	HOWR	R	Res	
winter wren	*Troglodytes troglodytes*	WIWR	U	Res	RIP, RWF
golden-crowned kinglet	*Regulus satrapa*	GCKI	U	Winter	MHF, MPF
ruby-crowned kinglet	*Regulus calendula*	RCKI	C	Oct-Apr	RF, CS, MHF, EF
blue-gray gnatcatcher	*Polioptila caerulea*	BGGN	R	Cas	
western bluebird	*Sialia mexicana*	WEBL	R	Cas	
Townsend's solitaire	*Myadestes townsendi*	TOSO	R	Cas	
Swainson's thrush	*Catharus ustulatus*	SWTH	U	Apr-Sept	RIP, WL, RWF
hermit thrush	*Catharus guttatus*	HETH	C	Winter	RIP, MHF, RWF, UR
American robin	*Turdus migratorious*	AMRO	A	Res	RIP, CS, CH, WL, MHF, MPF, EF, UR
varied thrush	*Ixoreus naevius*	VATH	U	Winter	CS, CH, MHF, RWF
wrentit	*Chamaea fasciata*	WREN	C	Res	CS, CH
northern mockingbird	*Mimus polyglottos*	NOMO	C	Res	UR
California thrasher	*Toxostoma redivivum*	CATH	R	Res	RIP, CH
European starling	*Sturnus vulgaris*	EUST	C	Res	RIP, UR
cedar waxwing	*Bombycilla cedrorum*	CEWA	C	Sept-May	MHF, UR
orange-crowned warbler	*Vermivora celata*	OCWA	C	Mar-Oct	RIP, CS, CH, WL
Nashville warbler	*Vermivora peregrina*	NAWA	R	Cas	
yellow warbler	*Dendroica petechia*	YEWA	U	Cas	
yellow-rumped warbler	*Dendroica coronata*	YRWA	C	Winter	RIP, MHF, EF
black-throated gray warbler	*Dendroica nigrescens*	BTGW	U	Cas	
Townsend's warbler	*Dendroica townsendi*	TOWA	U	Aug-May	OWL, MHF, RWF, EF
hermit warbler	*Dendroica occidentalis*	HEWA	R	Aug-May	
black-and-white warbler	*Mniotilta varia*	BWWA	R	Cas	
common yellowthroat	*Geothlypis trichas*	COYE	R	Cas	

Birds of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Species Code	Abundance	Presence	Habitat
MacGillivray's warbler	*Oporornis tolmiei*	MAWA	R	Spr-Su	CS, OWL
Wilson's warbler	*Wilsonia pusilla*	WIWA	C	Apr-Sept	RIP, CS
western tanager	*Piranga ludoviciana*	WETA	U	Cas	
Spotted towhee	*Pipilo maculatus*	SPTO	A	Res	RIP, CS, CH, MHF
California towhee	*Pipilo crissalis*	CATO	A	Res	RIP, CS, CH, MHF, UR
fox sparrow	*Passerella iliaca*	FOSP	C	Oct-Apr	RIP, CS, CH
Lincoln's sparrow	*Melospiza lincolnii*	LISP	R	Cas	
song sparrow	*Melospiza melodia*	SOSP	A	Res	RIP, CS
white-throated sparrow	*Zonotrichia albicollis*	WTSP	R	Oct-May	
white-crowned sparrow	*Zonotrichia leucophrys*	WCSP	C	Winter	GL, CS
golden-crowned sparrow	*Zonotrichia atricapilla*	GCSP	C	Sept-May	RIP, CS, WL
dark-eyed junco	*Junco hyemalis*	DEJU	A	Res	CS, MHF, RWF, EF, UR
rose-breasted grosbeak	*Pheuticus ludovicianus*	RBGR	R	Cas	
black-headed grosbeak	*Pheuticus melanocephalus*	BHGR	C	May-Sept	RIP, OWL, MHF
lazuli bunting	*Passerina amoena*	LABU	U	Spr/Su	RIP, GL, CS, EF
red-winged blackbird	*Agelaius phoeniceus*	RWBL	U	Cas	
Brewer's blackbird	*Euphagus cyanocephalus*	BRBL	A	Res	GL
brown-headed cowbird	*Molothrus ater*	BHCO	U	Res	RIP, UR
hooded oriole	*Icterus cucullatus*	HOOR	R	Cas	
Bullock's oriole	*Icterus bullockii*	BUOR	U	Summer	RF, OWL, EF
purple finch	*Carpodacus purpureus*	PUFI	C	Res	RF, MHF, RWF, MPF
Cassin's finch	*Carpodacus cassinii*	CAFI	R	Cas	
house finch	*Carpodacus mexicanus*	HOFI	A	Res	RIP, MHF, UR
red crossbill	*Loxia curvirostrata*	RECR	R	Spr/Su	
pine siskin	*Carduelis pinus*	PISI	C	Res	RIP, MDW, RWF, MPF, EF
lesser goldfinch	*Carduelis psaltria*	LEGO	C	Res	RIP, GL, WL, UR
Lawrence's goldfinch	*Carduelis lawrencei*	LAGO	R	Cas	
American goldfinch	*Carduelis tristis*	AMGO	C	Res	RIP, CH, MHF
evening grosbeak	*Coccothraustes vespertinus*	EVGR	R	Cas	
house sparrow	*Passer domesticus*	HOSP	A	Res	UR

Key

Abundance	
A:	Abundant
C:	Common
U:	Uncommon
R:	Rare
Presence	
Res:	Year-around resident
Cas:	Sighted occasionally, not known to use the watershed, includes non-breeding migrants
Habitat	
RIP:	Riparian
RF:	Riparian forest
GL:	Grassland
CS:	Coastal scrub
CH:	Chaparral
WL:	Unspecified woodland
OWL:	Oak woodland
MHF:	Mixed hardwood forest
RWF:	Redwood forest
MPF:	Monterey pine forest
EF:	Eucalyptus forest
UR:	Urban

Mammals of the upper Sausal Creek watershed

Common Name	Scientific Name	Habitat	Probability
Virginia opossum	*Didelphis virginiana*	Various, never far from water	Observed
ornate shrew	*Sorex ornatus*	Open areas, grassland, woodland, riparian	Medium
Trowbridge's shrew	*Sorex trowbridgii*	Redwood forest, mixed forest, chaparral	High
vagrant shrew	*Sorex vagrans*	Meadows, moist open areas, riparian	Low
broad-footed mole	*Scapanus latimanus*	Areas with light, sandy soils	Observed
pallid bat	*Antrozous pallidus*	Most common in open dry habitat, but occurs in a wide variety of habitats	Medium
big brown bat	*Eptesicus fuscus*	Chaparral, open areas, open woodlands and forests	Medium
silver-haired bat	*Lasionycteris noctivagans*	Forests	Low
red bat	*Lasiurus borealis*	Forests and woodlands, edge habitat	Low
hoary bat	*Lasiurus cinereus*	Wooded areas, open habitat, habitat mosaics	Medium
California myotis	*Myotis californicus*	Oak woodlands, chaparral, forests	High
long-eared myotis	*Myotis evotis*	Coniferous forests, chaparral	Low
little brown myotis	*Myotis lucifugus*	Riparian, chaparral	Low
fringed myotis	*Myotis thysanodes*	Hardwood and coniferous forests, riparian	High
long-legged myotis	*Myotis volans*	Woodland, forest, chaparral,coastal scrub	High
Yuma myotis	*Myotis yumanensis*	Open forests and woodlands	Medium
western pipistrelle	*Pipistrellus hesperus*	Open, arid areas	Low
Townsend's long-eared bat	*Corynorhinus (Plecotus) townsendii*	Mesic habitat, habitat edges	High

Mammals of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Habitat Type	Probability
western mastiff bat	*Eumops perotis*	Open, arid areas	Low
guano bat (Brazilian free-tailed bat)	*Tadarida brasiliensis*	Grassland, coastal scrub, chaparral, woodland	High
coyote	*Canis latrans*	Open country, ecotones, urban fringes	Observed
gray fox	*Urocyon cinereoargenteus*	Chaparral, forested areas	Observed
red fox	*Vulpes vulpes*	Grassland, coastal scrub, mixed chapparal	Observed
raccoon	*Procyon lotor*	Forest, urban areas, riparian	Observed
striped skunk	*Mephitis mephitis*	Riparian, edge habitat	Observed
spotted skunk	*Spilogale putorius*	Open-mature chaparral, riparian, edge habitat	Medium
long-tailed weasel	*Mustela frenata*	Riparian, open forest, woodland, shrub habitat	High
feral house cat	*Felis catus*	Various	Observed
mountain lion	*Felis concolor*	Riparian, brushy stages of various habitats	Observed
bobcat	*Lynx rufus*	Intermediate stages of riparian and oak habitat, chaparral	Medium
black-tailed deer	*Odocoileus hemionus*	Forests, scrubland, meadows, urban/wildland interface	Observed
California ground squirrel	*Spermophilus beecheyi*	Grazed grasslands	Low
fox squirrel	*Sciurus niger*	Urban/wildland interface, urban parks	Observed
Botta's pocket gopher	*Thomomys bottae*	Light soils, lawns, meadows	Observed
Heerman's kangaroo rat	*Dipodomys heermannii*	Annual grassland, coastal scrub, mixed chaparral	Medium

Mammals of the upper Sausal Creek watershed (cont.)

Common Name	Scientific Name	Habitat Type	Probability
California pocket mouse	*Chaetodipus (Perognathus) californicus*	Grassland/chaparral edges, coastal scrub, hardwood habitats	High
dusky-footed woodrat	*Neotoma fuscipes*	Hardwood forests and scrub, mature chaparral	High
brush mouse	*Peromyscus boylii*	Chaparral, oak and riparian associations	Medium
parasitic mouse	*Peromyscus californicus*	Oak, bay, hardwood woodlands, mature chaparral, coastal scrub	High
deer mouse	*Peromyscus maniculatus*	Forest, coastal scrub, open chaparral, grassland	High
piñon mouse	*Peromyscus truei*	Open woodland and brushy areas	Low
harvest mouse	*Reithrodontomys megalotis*	Grasslands, open chaparral, coastal scrub, riparian	Medium
California meadow vole	*Microtus californicus*	Wet meadows, dense annual grassland	High
house mouse	*Mus musculus*	Houses and nearby, fields, brushy areas	High
brown rat	*Rattus norvegicus*	Near buildings and in wild areas	High
roof rat	*Rattus rattus*	Blackberry thickets, trees, attics	Observed
black-tailed hare	*Lepus californicus*	Shrub habitats with intermediate canopy, open edge habitat	Low
Audubon's cottontail	*Sylvilagus audubonii*	Mature chapparal, coastal scrub, grassland, brush/grassland edges	Medium
brush rabbit	*Sylvilagus bachmani*	Mature costal scrub, chapparal	Observed

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I. INTRODUCTION

A. PURPOSE OF THE RESPONSE TO COMMENTS DOCUMENT

This document has been prepared to respond to comments received on the Draft Environmental Impact Report (Draft EIR) prepared for the Measure DD Implementation Project (SCH# 2006122048). The Draft EIR identifies the likely environmental consequences associated with the implementation of the proposed project, and recommends mitigation measures to reduce potentially significant impacts. This Response to Comments (RTC) Document provides responses to comments on the Draft EIR and makes revisions to the Draft EIR, as necessary, in response to these comments or to amplify or clarify material in the Draft EIR.

This RTC Document, together with the Draft EIR, constitutes the Final EIR for the proposed project.

B. ENVIRONMENTAL REVIEW PROCESS

According to CEQA, lead agencies are required to consult with public agencies having jurisdiction over a proposed project and to provide the general public with an opportunity to comment on the Draft EIR.

The City of Oakland circulated a Notice of Preparation (NOP) that included a list of potential environmental effects that could result from the proposed project. The NOP was published on December 8, 2006 and a public scoping meeting was conducted on January 3, 2007. Comments received by the City on the NOP were taken into account during the preparation of the EIR.

The Draft EIR was made available for public review on July 20, 2007 and distributed to applicable local and State agencies. Copies of the Notice of Availability of the Draft EIR (NOA) were mailed to all individuals previously requesting to be notified of the Draft EIR, in addition to those agencies and individuals who received a copy of the NOP. Verbal comments on the Draft EIR were accepted at the City of Oakland Planning Commission meeting held on September 5, 2007.

The CEQA-mandated public comment period for the Draft EIR ended on September 11, 2007. The comment period extended over a 53-day period, about a week longer than the 45-day comment period required by the *California Environmental Quality Act (CEQA) Guidelines*, Section 15105(a). The Copies of all written comments received during the comment period are included in Chapter III of this document.

C. DOCUMENT ORGANIZATION

This RTC Document consists of the following chapters:

- *Chapter I: Introduction.* This chapter discusses the purpose and organization of this RTC Document and the Final EIR, and summarizes the environmental review process for the project.

- *Chapter II: List of Commenting Agencies, Organizations and Individuals.* This chapter contains a list of agencies, organizations, and persons who submitted written comments or spoke at the public comment session on the Draft EIR during the public review period.
- *Chapter III: Comments and Responses.* This chapter contains reproductions of all comment letters received on the Draft EIR as well as a summary of the comments provided at the public comment session. A written response for each CEQA-related comment received during the public review period is provided. Each response is keyed to the preceding comment. It should be noted that many of the comments received do not pertain to the CEQA analysis, but relate to the merits of the project or other issues. While these comments will be included in the record before the decision-makers, the purpose of this document is to respond to CEQA comments and not other issues.
- *Chapter IV: Draft EIR Revisions.* Corrections to the Draft EIR necessary in light of the comments received and responses provided, or necessary to amplify or clarify material in the Draft EIR, are contained in this chapter. Text with underline represents language that has been added to the Draft EIR; text with ~~strikeout~~ has been deleted from the Draft EIR. Revisions to figures are also provided, where appropriate.

II. LIST OF COMMENTING AGENCIES, ORGANIZATIONS AND INDIVIDUALS

This chapter presents a list of letters and comments received during the public review period and it describes the organization of the letters and comments that are included in Chapter III, Comments and Responses, of this document.

A. ORGANIZATION OF COMMENT LETTERS AND RESPONSES

Chapter III includes a reproduction of each letter received on the Draft EIR. The written comments are grouped by the affiliation of the commentor, as follows: State, local and regional agencies (A) and organizations and individuals (B). Verbal comments (C) provided at the Planning Commission meeting held on September 5, 2007 are provided in the order that they were given at the meeting.

The comment letters are numbered consecutively following the A and B designations. Verbal comments are numbered consecutively following the C designations. The letters are annotated in the margin according to the following code:

State, Local and Regional Agencies:	A1-#
Individuals & Organizations:	B1-#
Verbal Comments	C1-#

The letters are numbered and comments within that letter are numbered consecutively after the hyphen.

B. LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS COMMENTING ON THE DRAFT EIR

The following comment letters were submitted to the City during the public review period and are arranged in order by the date received at the City.

State, Local and Regional Agencies

A1	AC Transit Nancy Skowbo, Deputy General Manager for Service Department	September 10, 2007
A2	Bay Conservation and Development Commission (BCDC) Sara Polgar, Planner	August 27, 2007
A3	Alameda County Flood Control and Water Conservation District County of Alameda Public Works Agency Kwablah Attiogbe, Environmental Services Supervisor	September 10, 2007
A4	East Bay Municipal Utility District (EBMUD)	September 10, 2007

	William Kirkpatrick, Manager of Water Distribution Planning	
A5	East Bay Regional Park District Chris Barton, Senior Planner	September 5, 2007
A6	California Department of Transportation (Caltrans) Timothy Sable, District Branch Chief	September 10, 2007
A7	California Public Utilities Commission (PUC) Kevin Boles, Environmental Specialist	August 31, 2007
A8	United States Coast Guard David H. Sulouff, Chief, Bridge Section	September 7, 2007

Organizations and Individuals

B1	Golden Gate Audubon Society John Bowers, Member, East Bay Conservation Committee	September 7, 2007
B2	California Oaks Foundation Janet Santos Cobb, President	September 10, 2007
B3	Law Offices of Brian Gaffney Matt McFarland	September 7, 2007
B4	Bishop Architecture Ron Bishop, Architect - AIA	September 11, 2007
B5	Ron Bishop	September 5, 2007
B6	Friederike E. Droegemueller	September 19, 2007
B7	John MacHenry	September 11, 2007
B8	Joe Matera Acting President, Essex Homeowners Association	September 11, 2007
B9	David Gill Past President, Lakeside Regency Plaza Homeowners Association	September 11, 2007
B10	David Mix	September 5, 2007
B11	David Mix	September 13, 2007
B12	David Mix	September 11, 2007
B13	Gloria Pieretti	September 10, 2007
B14	Ken Pratt	September 11, 2007
B15	Nancy Rieser	August 5, 2007
B16	Nancy Rieser	September 10, 2007
B17	John Wilson	September 11, 2007
B18	Elise Ackerman	September 11, 2007
B19	Barton Mayhew	September 11, 2007
B20	Catherine McBride	September 11, 2007
B21	Inlandboatmen's Union of the Pacific Marina Secchitano, Vice President	September 5, 2007

B22	Hanson Aggregates Mike Bishop, Marine Operations Manager	September 10, 2007
B23	Gallagher & Burk Materials Division Alan French, General Manager	August 22, 2007
B24	Union Pacific Railroad Company Jeff Asay, Senior Counsel – Western Region	September 10, 2007
B25	Steefel, Levitt & Weiss Shirley E. Jackson	September 14, 2007
C1	Planning Commission Public Hearing Comments	September 5, 2007

III. COMMENTS AND RESPONSES

Written responses to each comment letter received on the Draft EIR are provided in this chapter. Letters received during the public review period on the Draft EIR are provided in their entirety. Each letter is immediately followed by responses keyed to the specific comments. The letters are grouped by the affiliation of the commenting entity as follows: State, local and regional agencies and commissions (A); organizations and individuals (B); and public hearing comments (C).

The reader should note that where text within individual letters is not enumerated, it does not raise environmental issues and does not relate to the information or analysis within the Draft EIR; therefore, no response is required.

MASTER RESPONSE M-1 – PROJECT-RELATED TREE REMOVALS

The City has received comments on the Draft EIR's analysis of the tree removals associated with the implementation of Measure DD-funded activities and has prepared Master Response M-1 to address this issue. Master Response M-1 also provides updated information about events related to three tree removal permits that occurred after the Draft EIR was published. The Master Response includes revisions to the Draft EIR made to disclose these events and to respond to specific comments made on the Draft EIR.

Summary of Events Related to Permits to Remove Trees around Lake Merritt

In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures required by previously prepared CEQA documents. As a result, because none of the circumstances calling for preparation of a subsequent or supplemental EIR were present the City prepared an Addendum to the previous environmental documents.

In December 2005, the City issued three permits for the removal of trees around Lake Merritt. The tree removals are part of the implementation process for the reconstruction of 12th Street and park and street improvements along Lakeshore Avenue, Lakeside Drive and at the Municipal Boathouse. In accordance with CEQA, prior to approving these permits, the City prepared an environmental analysis of the proposed removals, which showed that none of the circumstances calling for preparation of a subsequent or supplemental EIR were present. In August 2006, a lawsuit was filed that challenged the City's granting of the permits. The lawsuit made several arguments against the approval of the permits including that the tree removals would have an aesthetic impact and impacts on biological resources. Further, the lawsuit claimed that the City's environmental review of the permits was inadequate and that additional CEQA documentation should be prepared to address the proposed tree removals. At the time that the Draft EIR for the Measure DD Implementation Project was published in July 2007, the lawsuit was still pending. On October 10, 2007, the Superior Court of California, County of Alameda, upheld the permits, finding that "substantial evidence does not exist in the record to support a fair argument that the issuance of the tree permits may have a significant effect on the environment requiring an EIR be prepared." Thereafter, the City removed some trees around Lake Merritt, including those along Lakeshore Avenue and Lakeside Drive near the Municipal Boathouse pursuant to the permits.

The City issued the Notice of Preparation (NOP) for the Measure DD Implementation Project EIR on December 8, 2006. As some project components had already been planned, designed and funded in reliance upon the 2002 Addendum and prior to the City's decision to prepare this EIR, some components of Measure DD were already constructed or were under construction. These components are described and analyzed in the EIR at a level appropriate to their stage of development when the NOP for the project was issued in December 2006. Included in the Draft EIR is an analysis of the impacts of the project-related tree removals around Lake Merritt and elsewhere. This analysis was included in the EIR because the tree removals had not occurred at the time the NOP was published

and thus the trees were part of the environmental setting against which the impacts of the project were assessed.

Consistent with the City's previous analysis, the Measure DD Implementation Project EIR finds that the tree removals will not have any significant unmitigated environmental effects. Although the removal of some trees has already occurred in accordance with the City's tree removal permit process, the removal does not alter the analysis or findings of this EIR. Subsequent removals associated with the previously issued permits will be performed in accordance with the information and analysis presented in the Measure DD Implementation Project EIR and previous environmental documentation, as have the removals that have already occurred.

In recognition of the Court's ruling upholding the City's CEQA determination on the tree permits and affirming their validity and to reflect the fact that some trees have been removed and others will be removed in accordance with the previously issued permits, and that new trees will be planted in accordance with the previously issued tree permits, the text of the Draft EIR is revised as indicated below. Where appropriate, the revised text includes revisions made in response to specific comments that are addressed elsewhere in the Response to Comments document. Revisions have been made to the Project Description (Chapter III), Biological Resources (Section IV.F), Aesthetic Resources (Section IV.M); and Alternatives (Chapter V).

Project Description (Chapter III)

The text that begins on Page 23 of the Draft EIR is revised as follows:

MEASURE DD BACKGROUND

In November 2002, Oakland voters passed a $198,250,000 bond measure entitled *Oakland Trust for Clean Water, Safe Parks* (Measure DD). This bond measure authorizes funding for physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration activities.

In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures required by ~~in~~ previously prepared CEQA documents. As a result, because none of the circumstances calling for preparation of a subsequent or supplemental EIR were present, ~~and thus~~ the City prepared an Addendum to the previous environmental documents.

As more defined proposed project components have been identified since the 2002 Addendum, the City has now decided to prepare this EIR to provide a more comprehensive environmental analysis for the Measure DD Implementation Project. As some project components had already been planned, designed and funded in reliance upon the 2002 Addendum and prior to the City's decision to prepare this EIR, some components of Measure DD have already been constructed or are currently under

construction. These components are described and analyzed at a level appropriate to their stage of development when the NOP for the project was issued in December 2006.

~~As of this writing, there is a pending lawsuit that challenges the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. The City has not implemented these approvals during the pendecy of the lawsuit.~~ At the time the Draft EIR was published in July 2007, a lawsuit was pending that challenged the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. On October 10, 2007 subsequent to the close of the public review period for the Draft EIR, the Superior Court of California, County of Alameda, upheld the tree permits and the City's CEQA determination for the tree permits ruling that "substantial evidence does not exist in the record to support a fair argument that the issuance of the tree permits may have a significant effect on the environment requiring an EIR be prepared." The court also dismissed the challenge to the Channel Wetlands and Widening Project EIR and entered judgment in favor of the City. Thereafter, the City removed some trees around Lake Merritt, including those along Lakeshore Avenue and Lakeside Drive near the Municipal Boathouse pursuant to the permits. None of these removals (nor any other circumstances occurring subsequent to circulation of the Draft EIR) alter the EIR's analysis or conclusions. The EIR acknowledges that the tree removals will occur and new trees will be planted in accordance with the previously issued permits.

The text at the bottom of page 30 of the Draft EIR is revised as follows:

The City is proposing to renovate existing plantings and irrigation around the 12th Street component site. This includes removing approximately 157 existing trees from the median strip along 12th Street, the Kaiser Convention Center parking lot and some areas along the banks of the Lake Merritt Channel and replanting these areas with approximately 321 new trees and other landscaping. The final numbers of trees removed or planted may differ slightly from these counts. Some trees will ~~would~~ be removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy. Figure III-3 shows the area where trees are ~~proposed~~ to be removed as part of this project component. As part of the project design process the City hired a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ around Lake Merritt and the Lake Merritt Channel. The arborist recommended preserving four trees in this area by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project. The arborist's report is provided in Appendix I.

The fourth sentence in the last paragraph at the bottom of page 35 of the Draft EIR is revised as follows:

The City will ~~is proposing to~~ remove some existing trees (approximately 58) along the channel as shown in Figure III-5.

The text at the top of page 41 of the Draft EIR is revised as follows:

(2) Lakeshore Avenue Variant B. Lakeshore Avenue Variant B proposes to re-stripe the street to create one travel lane in each direction, a Class 2 bike lane in each direction, a continuous

left-turn lane down Lakeshore Avenue, and parking lanes along both curbs. A planting strip, including street trees, would be included along the park border. A multi-use path would be installed between the planting strip and the park landscaped area. As with Variant A, park landscaping would be renovated ~~and the removal of~~ with some trees removed~~is proposed~~. The surface of the lakeside path would be resurfaced with stabilized decomposed granite and would be widened at the narrow spots. The pedestrian crossing at Cleveland Cascade would be improved and mid-street pedestrian islands would be included at intersections as appropriate. Typical construction activities would include paving, grading, path resurfacing and replanting of landscaping.

The text at the bottom of page 41 of the Draft EIR is revised as follows:

(7) Landscaping Improvements. Approximately 9 acres of existing planting and irrigation are proposed to be renovated along Lakeshore Avenue. This renovation ~~would~~ includes removing approximately 24 existing trees and planting approximately 135 new trees. The final numbers of trees removed or planted may differ slightly from these counts. As part of the project design process the City hired a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ around Lakeshore Avenue. The arborist recommended preserving one tree in this area by relocating it. The City has incorporated this recommendation into the project. The arborist's report is provided in Appendix I. The trees were identified for removal ~~would be removed~~ because they are diseased, have severe structural defects, are crowding buildings, conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy. Landscaped areas with shrubs and ground cover would replace the existing lawn in narrower parts of the park corridor. This substitution would reduce maintenance and water use and reduce the attractiveness of the area to Canada geese. Hardscape development, including benches and patios, would be added at creek nodes and areas where small peninsulas jut out into the Lake. Figure III-7 shows a proposed landscaping plan, which indicates where trees would be removed and new trees would be planted.

The text at the top of page 47 of the Draft EIR is revised as follows:

Approximately 4 acres of existing planting and irrigation are proposed to be renovated along Lakeside Drive and around the Boathouse. This renovation ~~would~~ includes removing approximately 20 existing trees and planting approximately 65 new trees. The final numbers of trees removed or planted may differ slightly from these counts. The trees were identified for removal ~~would be removed~~ because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees that have reached the end of their life expectancy. Figure III-9 shows the proposed landscape plan, which indicates the locations of ~~where~~ tree removals ~~would be removed~~ and new tree plantings ~~would be planted~~.

Biological Resources (Section IV.F)

The text that begins at the bottom of page 211 of the Draft EIR is revised as follows:

(1) Candidate, Sensitive, or Special-status Species. The only special-status species potentially occurring within all component groups is Cooper's hawk, a California Species of Special Concern. The numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk. In addition, some of the creek restoration sites in the upper Oakland watershed may contain suitable nest trees for

sharp-shinned hawk. Both these species are California Species of Special Concern. ~~Proposed t~~Tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-shinned hawks by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure and/or nest abandonment.

Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-shinned hawks to a less-than-significant level. The pre-construction survey shall be conducted within 15 days prior to the start of work from March 15 though May (since there is higher potential for birds to initiate nesting during this period), and within 30 days prior to the start of work from June through August 15.

The discussion of protected trees in the middle of page 213 of the Draft EIR is revised as follows:

(6) Protected Trees. Based on current plans, the Lake Merritt and Lake Merritt Channel group includes removal of ~~proposes to remove~~ a number of ~~protected~~ trees protected under the City's Tree Ordinance. Protected trees might also be removed as part of the Waterfront Trail, Recreational Facilities, and City-wide Creeks groups. This impact is discussed in Section IV.F2c.

The discussion of protected trees beginning on page 218 of the Draft EIR is revised as follows:

(6) Protected Trees. In order to create additional parkland along the south shore of Lake Merritt and make other improvements around the Lake, approximately 259 trees, including 129 protected trees, are to ~~would~~ be removed and 521 new trees and other landscaping are to ~~would~~ be installed to replace them. Approximately 510 existing trees will ~~would~~ be retained. Overall, the trees will ~~would~~ be replaced at about a 2:1 ratio, that is, two trees will ~~would~~ be planted for each tree removed. Table IV.F-3 summarizes the ~~proposed~~ tree removals and new plantings by project component within the Lake Merritt and Lake Merritt Channel project group. As part of the project design process the City engaged a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ in this group. The arborist recommended preserving five trees by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project and the numbers in Table IV.F-3 reflect the preservation of these trees. The arborist's report is provided in Appendix I.

Table IV.F-3: ~~Proposed~~ Tree Removals for the Lake Merritt and Lake Merritt Channel Project Group

Project Component	Trees to be Retained[a]	Trees to be Removed ~~Proposed for Removal~~	Protected Trees to be Removed ~~Proposed for Removal~~	New Trees to be Planted	Ratio of Trees Planted to Trees Removed
Lakeside Drive/Municipal Boathouse	30	20	17	65	3.25
Lakeshore Avenue/El Embarcadero	90	24	6	135	5.4
12th Street Reconstruction	50	157	90	321	2.0
Lake Merritt Channel	340	58	16	0[b]	0
TOTAL	**510**	**259**	**129[c]**	**521**	**2.0**

[a] Numbers of trees are approximate. Totals include trees recommended for preservation or relocation by the certified arborist.

[b] No new trees will ~~would~~ be planted along the Channel because the habitat type would be converted from landscaped urban parkland to wetlands and open water.
[c] Includes eight protected oak trees.
Source: HortScience, 2007.

The City of Oakland's Tree Preservation and Removal Ordinance (OMC Chapter 12.36) requires a permit for removal of protected trees. A permit is also required if work might damage or destroy protected trees. The project will ~~would~~ comply with the Tree Preservation and Removal Ordinance and ~~would~~ obtain permits for the removal of any protected trees. In addition, the City considers other factors in determining significance for purposes of CEQA including: the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, with special consideration given to native trees, as discussed below.

The majority of protected trees to be removed are located in the 12th Street reconstruction area. Although protected trees are present in this area many of the trees are in poor or fair condition (see Appendix I); are in the landscaped median strip for 12th Street that is accessible only via rarely used pedestrian underpasses; or are in small planting strips within the parking lot for the Kaiser Convention Center (see Figure III-3). Most of the trees are non-native ornamental species. When the project components around Lake Merritt are looked at as a whole, about twice as many trees are retained in the project area as are to ~~would~~ be removed and approximately two trees will ~~would~~ be planted for each tree removed. The new trees in the 12th Street reconstruction area will ~~would~~ be part of proposed landscaped areas that would have direct pedestrian access to Lake Merritt and surrounding civic buildings. The four components of Group 1 (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and Lake Merritt Channel) either retain more trees than they ~~would~~ remove and/or plant at least twice as many new trees as are ~~would be~~ removed (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and 12th Street Reconstruction). Eight trees to be removed are protected native oak trees.

The project would not fundamentally conflict with the City of Oakland's Tree Preservation and Removal Ordinance and would therefore be a less-than-significant impact for the following reasons: approximately twice as many trees will ~~would~~ be retained as will ~~would~~ be removed; removed trees will ~~would~~ be replaced at approximately a 2:1 ratio; the majority of trees to be removed are in poor or fair condition; and many are located in a parking lot or an inaccessible median strip. In addition, because trees are being replaced at approximately a 2:1 ratio many benefits lost by the removal of trees, such as aesthetics, energy conservation, reductions in stormwater runoff, improvements in air quality, and capture of carbon dioxide (a greenhouse gas) will ~~would~~ be compensated for in a few years because of the large number of new trees being planted. The impacts of removing trees and the benefits of planting new trees in the Lake Merritt and Lake Merritt Channel group were estimated quantitatively using a computer application developed by scientists at the United States Department of Agriculture (USDA) Forest Service's Pacific Southwest Research Station to assess populations of street trees.[1] The results of this study are provided in Appendix I. Because the City would comply with the Tree Preservation and Removal Ordinance, the Lake Merritt and Lake Merritt Channel project components would have a less-than-significant impact. To reach this conclusion, the City considered the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, including native trees.

[1] USDA Forest Service. http://www.itreetools.org/street_trees/introduction_step1.shtm.

A small number of protected trees may require removal as part of the Waterfront Trail, Recreational Facilities, City-wide Creeks groups or other components of the Lake Merritt group (e.g., the Cleveland Cascade). The trees would be replaced in accordance with the City's Tree Protection Ordinance and Standard Conditions of Approval (Condition 32), which would reduce the impact to a less-than-significant level.

Aesthetic Resources (Section IV.M)

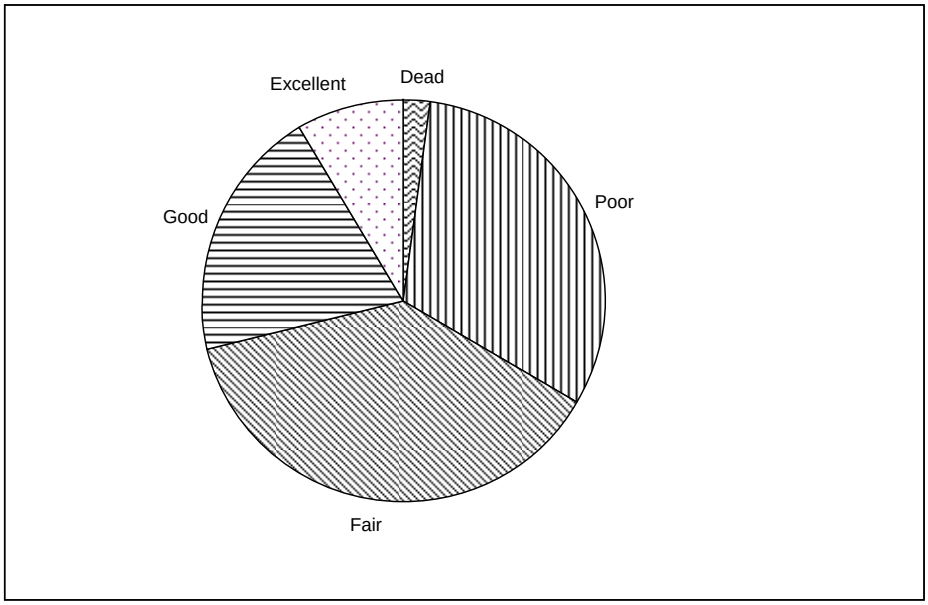
Page 336 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and the Lake Merritt Channel are resources that are part of scenic vistas seen from numerous locations in Oakland, including the City's Downtown and hillside areas. The proposed project would result in beneficial impacts to the visual quality of the Lake through water quality control measures, the restoration of historic buildings and monuments around the perimeter of the Lake, and enhanced landscaping. These changes to the Lake and the Channel would result in small but beneficial improvements to scenic vistas encompassing these waterways. ~~The project would result in the r~~Removal of certain ~~diseased~~ trees from the vicinity of the Lake is consistent with and in furtherance of the project.~~;~~ The removal of these trees will enhance the visual character of the Lake and ~~; however, the removal of these trees~~ will ~~would~~ not substantially adversely change scenic vistas. New trees will ~~would~~ be planted to replace the trees that are removed, and these trees will not substantially block scenic vistas. No structures would be built that would block surroundings and would not block scenic views of the Estuary. Therefore, this group of project components would have a less-than-significant impact on scenic vistas.

Page 341 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). A key component of this group is the various proposed water quality control measures, including the installation of devices and features to clean and circulate water, and the creation of an open channel to allow for increased tidal flow into and out of the Lake. These measures, by improving water quality in the Lake, would enhance the scenic qualities of the waterway (including portions of the Lake visible from I-580), which suffers from algal blooms and stagnation associated with a surplus of nutrient-rich pollution. In addition, this group would involve the renovation of existing landscaping, which would improve the landscape context of the Lake. ~~As part of the project, certain trees would be removed (and replaced with healthy individuals).~~ Based on the Tree Assessment prepared by HortScience, Inc. (Appendix I), of the 269 trees that will be removed as part of the project, 6 are dead, 84 are in poor condition, 101 are in fair condition, 55 trees are in good condition, and 23 trees are in excellent condition (see Chart IV.M-1). As shown in Chart IV.M-1, ~~M~~many of the trees considered for removal ~~that would be removed~~ are diseased, short-lived, or are not stable (i.e., they are dead, or in poor to fair condition). Although some of the trees subject to removal may ~~that would be removed~~ contribute or may have contributed to the scenic quality or overall visual character of the Lake, this contribution is not significant either individually or cumulatively. In context, approximately 500 trees will be retained in the project area and 521 trees will be planted as part of the project (a replacement ratio of almost two trees for every removed tree). These replacement trees will fill in any visual "gaps" created by the removed trees. As shown in Figures IV.M-1 through IV.M-4, the removal of trees from the site will not adversely affect scenic resources or visual character as seen from key viewpoints around Lake Merritt.

Chart IV.M-1: Tree Condition and Frequency of Occurrence



Source: HortScience, Inc., 2007.

This conclusion is also supported by a cost/benefits analysis of tree removal/replacement conducted by HortScience as part of the Tree Assessment. Using a model that takes into account the environmental and economic benefits of trees (including improvement of visual quality, reductions in storm water runoff, improvements in air quality, and sequestration of carbon dioxide), HortScience determined that the trees subject to removal from the site provide an estimated $29,438 in annual benefits, approximately 77 percent of which ($22,866) is associated with aesthetic value. At planting, the 521 replacement trees will provide an estimated $22,986 in annual benefits, "almost entirely due to aesthetic and other benefits." As the trees mature, the value of their annual benefits will increase to $33,193 at 5 years and $40,700 at 20 years. Therefore, based on the model, within only 5 years of planting, the replacement trees will be more valuable in terms of aesthetics and other environmental/ economic benefits than the existing trees that will be removed as part of the project. Although there are limitations with assigning monetary values to resources like trees (i.e., resource valuation generally lacks a reliable way to estimate the value of ecological damage), the data produced by HortScience suggest that the aesthetic costs of tree removal do not outweigh the benefits of tree replacement. Based on the HortScience analysis, and an understanding of tree removal in the context of trees that will be preserved and trees that will be replaced as part of the project, ~~Therefore,~~ the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources or the visual character of the project site.

Page 342 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and its surroundings are characterized by a semi-formal landscape of rolling lawns and walkways, all oriented around the water body itself. While the area has high visual quality, the aesthetics of the area are diminished

primarily by low water quality in the Lake, landscaping and trees that are in poor condition, and roadways surrounding the Lake that are disproportionately wide and emphasize automobile traffic at the expense of the pedestrian environment. The proposed project would substantially improve these adverse conditions. First, the removal of the 12th Street culvert and the implementation of the various water quality control measures would improve the water quality of the Lake, and enhance the potential for the growth of native vegetation and use of the water body by native wildlife (besides Canada geese). Second, landscaping and trees in poor condition will ~~would~~ be removed and replaced with new plants that would enhance the visual environment. Third, several roadways (including 12th Street, Lakeshore Avenue, and Lakeside Drive) would be reconfigured and/or narrowed to include bike lanes and pedestrian paths. These changes would reduce the visual intrusion of motor vehicles and would improve the visual environment for the bikers and walkers that comprise the key users of Lake Merritt. Lastly, historic buildings around the Lake, some of which are in poor condition, would be rehabilitated. At the Municipal Boathouse, two parking lots next to the Lake and Boathouse would be removed and replaced with landscaping, terraces, and pathways. A smaller parking lot would be constructed closer to the road and the remaining parking would be relocated along Lakeside Drive itself. The improvement and preservation of historic structures, and the modification of parking areas would benefit the visual quality of the area, including the lakeshore itself. Therefore, the project group would have a less-than-significant impact on the existing visual character of the area surrounding the Lake and Lake Merritt Channel.

Alternatives (Chapter V)

The third paragraph of Section V.D on page 352 of the Draft EIR, is revised as follows:

For Group 1, the No Project alternative would include completion of the Pergola, Children's Fairyland, the E. 18th Street Pier, and Municipal Boathouse renovations. However, paths, landscape improvements and additional patron parking (for the Boathouse) that would provide improved access to the facilities would generally not be constructed. The land around Lake Merritt would continue to be used as park land. Landscape maintenance, including the removal and replacement old or diseased trees, would continue as needed. Trees will be removed along Lakeshore Avenue, Lakeside Drive and the 12th Street reconstruction area in accordance with the permits for the removal of trees previously issued by the City. ~~The tree replacement process would generally maintain the current appearance of the park, but no substantial increase in landscaped area or number of trees is likely to occur because there would be no net increase in parkland as would occur if the project were constructed as proposed.~~ The creation of bike lanes by restriping Lakeside Drive and Lakeshore Avenue might occur as part of other projects, but associated landscaping and pedestrian path improvements would not be constructed.

Table V-1 on page 353 of the Draft EIR, is revised as follows:

Table V-1: No Project Alternative (Groups 1 and 2): Components Completed or In Progress and Components Unbuilt

Lake Merritt and Lake Merritt Channel (Group 1)
Components Completed or In-Progress • Pergola Renovation (complete) • Installation of a Fire Protection Main (complete) • Water Quality Improvements, including storm drain filters at Bellevue/Staten, 27th/Valdez, and 22nd/Valley; pilot air diffuser project; new aeration fountain; Pergola fountain (complete) • Children's Fairyland Renovations (in-progress) • Municipal Boathouse Renovation (in-progress) • E. 18th Street Pier Improvements (in-progress) • Tree removals along Lakeshore Avenue and Lakeside Drive **Unbuilt Components** • 12th Street Improvements • Lake Merritt Channel • Lakeshore Avenue~~,~~ and El Embarcadero~~, and E. 18th Street Pier Improvements~~ • Lakeside Drive • Snow Park and Lakeside-Harrison-20th Street Intersection • Bellevue Avenue Redesign • Sailboat House • All water quality improvements except those noted above
Oakland Waterfront Trail (Group 2)
Components Completed or In-Progress • Union Point Park • Park Street Triangle traffic study • Alameda Avenue south of Fruitvale Avenue • 66th Avenue Gateway **Unbuilt Components** • Estuary Park • 10th Avenue Marina • Brooklyn Basin • Brooklyn Basin to Embarcadero Cove • Livingston Pier • Cryer Site • ConAgra to Park Street Bridge • Bridge boardwalks at Park Street, Fruitvale Avenue and High Street • Derby Avenue to Lancaster Street (Oakland Museum Women's Board warehouse) • ~~Alameda Avenue south of Fruitvale Avenue~~ • US Audio/Capture Technologies and friendly Transportation Trail Connection • Gallagher & Burk/Hanson Aggregate Trail Connection • ~~66th Avenue Gateway~~

The third paragraph of Section V.E.2 on page 356 of the Draft EIR, is revised as follows:

Although the City has a permit for tree removals in the 12th Street reconstruction area, as of this writing, none has been removed. The alternative would reduce the number of trees that will need to ~~would~~ be removed to allow the reconstruction and realignment of 12th Street. In this scenario, the Kaiser Convention Center parking lot would not be reconfigured and therefore the trees located in this area would be preserved. Approximately 59 trees would be preserved, including 12 protected trees (all flowering cherries), in and around the parking area. Trees along the median of the existing 12th

Street alignment would still be removed ~~require removal~~ in order to accommodate the new roadway and modified grade of the park land.

A. STATE, LOCAL AND REGIONAL AGENCIES AND COMMISSIONS

Letter
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Nancy Skowbo
Deputy General Manager - Service Development

September 10, 2007

City of Oakland
Public Works Department, Transportation Services Agency
250 Frank Ogawa Plaza, Suite 3315
Oakland, Ca. 94612

Subject: Draft Environmental Impact Report (EIR) for the Measure DD Implementation Project

To Whom It May Concern:

Thank you for the opportunity to comment on the Draft EIR on the Measure DD Implementation Project. We applaud the City's efforts to use this voter-approved funding source to rebuild and renew Lake Merritt and Oakland's park and recreation infrastructure. AC Transit supports the development of multi-use paths around Lake Merritt. AC Transit also supports improvements to the pedestrian realm, within which our passengers walk to and wait for buses. **1**

However, we are seriously concerned about some projected impacts of Measure DD projects. In particular, we are concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam. 12th Street Dam is one of the most critical links in the entire AC Transit system. It would be deeply unfortunate if the environmental benefits of Measure DD projects were undermined by environmental losses from transit.

11th and 12th Street from Martin Luther King Junior Way to 1st Avenue are specifically noted as streets of particular interest to AC Transit in the Transit Streets Cooperative Agreement recently signed by the City and AC Transit. The affected section of Harrison Street is served by line NL, one of the frequent service lines that the **2**

Agreement prioritizes. The Transit Streets Agreement lays out notification and consultation procedures for the City and AC Transit to use on projects affecting major transit corridors. The Agreement embodies and anticipates a spirit of collaboration and cooperation between the City and AC Transit. The 12th Street corridor is also discussed in the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the East Bay Bus Rapid Transit Project.

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AC Transit has had ongoing and constructive discussions with the Public Works Department about impacts of and mitigations for the 12th Street roadway reconstruction project. We believe that the plans developed for the long construction period of the project have substantially responded to AC Transit concerns. **2 cont.**

The Measure DD Project and AC Transit's Concerns

Measure DD is a $198 million bond passed by the voters of Oakland in 2002. Measure DD provided funds for park, recreation and open space projects throughout Oakland, with an emphasis on the Lake Merritt and Oakland waterfront areas. It also provides funds to develop a park in the former 9th Avenue Terminal area, the area where the Oak to 9th Project has been approved (pending legal actions). **3**

The project that is most significant to AC Transit involves the substantial narrowing of the roadway across Lake Merritt on the 12th St. Dam. A roadway that now provides six lanes in each direction would be reduced to three lanes in each direction. The existing roadway would be eliminated and a new roadway constructed somewhat farther from the Lake. We understand the City's desire to reduce the large amount of roadway in that area, but this must be balanced with the need to maintain viable transit operations. **4**

We are also concerned about projects that would take place in the area of 20th & Harrison Street which would cause delays to bus service in that important service area. **5**

12th Street Dam Roadway

Projected Travel Time Impact of Measure DD Project on 12th St.

In our letter concerning the Notice of Preparation (NOP) for this EIR, AC Transit stated "The EIR should analyze the likely impact of roadway changes on bus speeds during both the construction period and with the final configuration." The EIR includes information about existing travel time and projected change in vehicle travel time across the 12th St. dam in Tables IV.C-4, Tables IV.C-6, and Table IV.C-8. We appreciate the City of Oakland's responsiveness to our request. We have summarized the data in the table on Page 6 of this letter. **6**

However, the stated increases in travel time may underestimate the actual delay for buses. To the extent that buses need to pull into and out of traffic flow for stops, their travel time could be greater. However, the projected increases in travel time are for travel from Madison St. to Foothill Boulevard. Since some buses would leave this route at International Boulevard, increases in travel time could be smaller.

The travel time projections are presented as summary estimates for a roadway segment. It would be helpful if the methodology to develop these projections was discussed further and if the projections were also presented in more disaggregated form. It would also be helpful if midday delay estimates were provided. That would **7**

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allow us to more precisely estimate the potential impact of traffic delays on AC Transit operations and costs. **7 cont.**

Transit Service across 12th St. Dam—Current and Planned

The importance of the 12th Street roadway to the AC Transit system is hard to overstate. The 12th St. Dam has the second highest volume of AC Transit buses of any roadway in Oakland (after Broadway downtown). Six bus lines use this route; they are the1 International, the 1R International Rapid, 13 Lakeshore, 14 San Antonio, 18 Park, and 40 Foothill. The 1, 1R, 18 and 40 are among the busiest and most important routes in the AC Transit system. The six lines using 12th St. form the majority of the nine bus lines that connect East Oakland to Downtown Oakland. A seventh line to East Oakland, the NL, would be affected by the proposed Harrison Street project. In the peak hour, there are 54 buses traveling across 12th Street dam, nearly one bus per minute. **8**

If the proposed Bus Rapid Transit (BRT) line on International Boulevard is developed, it will use 12th Street and bus service on the route will increase further. BRT is planned to have very high frequency operations, perhaps as high as one bus in each direction every five minutes.

Significance of Delay on 12th St. Dam

Increased delay on 12th Street has an impact to AC Transit operations. It becomes more difficult and costly to provide the same bus service. If AC Transit's operating budget is constrained, delay can make it necessary to reduce service. However, delay also has an impact on the passengers using AC Transit, the automobile drivers who benefit from AC Transit passengers not driving, and to the City of Oakland's efforts to increase transit mode share and support transit.

We wish to stress that the projected 2-3 minute delays across 12th St. Dam are highly significant. Operationally, AC Transit often makes substantial efforts to reduce delay at a given location by as little as 15-30 seconds, so 194 seconds is a major impact. From the passenger's perspective, the average travel time on an AC Transit bus is 15-20 minutes, so a 2-3 minute delay creates a 10-20% increase in travel time. We doubt that most automobile drivers would regard analogous increases in travel times as unimportant. **9**

Increased Cost of Operations

AC Transit's full operating cost is $131 per hour of operation, so each minute of delay contributes to that cost. If it becomes necessary to operate additional buses to maintain the schedule, this would cost $250,000-$300,000 per year with no improvement in service (this might be described as running harder and harder to stay in the same place). Many AC Transit routes are tightly scheduled, with the minimum feasible running time and layover time at the end, so 2-3 minutes could force the addition of another bus. If delay on just two of the routes required the addition of one **10**

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bus apiece, the increased operating cost would be some $600,000 per year, in addition to increased operating costs incurred on the other four lines.

The information in the EIR is not sufficient to develop a precise estimate of the cost of the delay projected on the 12th St. roadway. The EIR does not include estimates of the delay at midday, on weekends, or at other times besides the peak. **10 cont.**

Aggregate Travel Time Impact with Other Projects Affecting the Same Bus Routes
The EIR also does not address the potential for aggregate impacts on the same bus routes as Measure DD projects. We asked for this information in our letter about the Notice of Preparation. Road narrowing or other projects elsewhere could delay the same bus routes as Measure DD, causing aggregate delays. We are concerned about this potential for all routes, but particularly for the 40 Foothill route. AC Transit service on Foothill Boulevard has already been delayed due to reduction in travel lanes on that street. We understand that the City is considering further narrowing of Foothill Boulevard, which could cause aggregate delays with this project. Potential aggregate impacts should be identified and addressed. **11**

Degradation of Service to Passengers
The impact on bus passengers is just as important as the impact on AC Transit. Bus passengers' trips would take longer. Some trips could become impossible, for example, buses might miss transfer connections that they would have otherwise have made. **12**

Degradation of the primary bus corridor to East Oakland also raises environmental justice issues. Passengers on these routes are overwhelmingly non-White and many are low income. It appears that they would absorb a disproportionate impact from improvements around Lake Merritt designed to benefit the city population as a whole. While auto drivers who now use 12th Street could seek routes that did not use the Dam, most transit passengers would not have this option. **13**

Degradation of bus service would also be inconsistent with Oakland's planning policies. Oakland has declared itself a "Transit First" city, pledging to prioritize improvements to transit. The Land Use and Transportation Element of Oakland's General Plan declares that the City should encourage transit and expedite the movement of transit vehicles. **14**

The City's policies would be especially undermined if passengers shifted from using the bus to driving alone. Close to 40% of AC Transit passengers had a vehicle available for trips they took on transit. Thus there is the potential for mode shifts in a negative direction. **15**

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Travel time impacts as CEQA Impacts

Although the language is somewhat ambiguous, the EIR seems to argue that the substantial delays in travel time it envisions should not be viewed as an impact under the California Environmental Quality Act (CEQA).

> "The City studied the 12th Street and Harrison Street corridors to understand how the project would affect traffic travel times in these areas, although the City does not have CEQA significance criteria for roadway delays because it believes that intersection analyses more accurately predict traffic impacts. Because traffic patterns change in response to traffic delays, the City believes that traffic impacts are better modeled by an intersection analysis for determining significance under CEQA. The travel time analysis was nevertheless performed to help understand how automobile, bus, and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components" (p.129).

16

AC Transit does not accept that view, at least with regard to bus travel. Instead, we believe that the delay in travel time is the primary impact on transit operations and passengers of this and other projects. Operational efficiency and passenger experience is affected by the overall ride more than the individual intersection. Travel time determines the cost of operation and the bus' competitiveness with other modes.

The EIR also argues that traffic patterns change in response to traffic delays. While this may be true for automobile drivers, buses generally cannot change routes in response to delays (we discuss this difficulty in Designing With Transit, p.5-6). Passengers expect the bus to operate on its designated route, even if that route has been made slower.

17

The City also considers a project which negatively impacts "alternative transportation" (such as bus transit) to have a CEQA impact. By imposing delays on large numbers of buses, this project would negatively impact alternative transportation.

18

Travel time delays, especially delays as large as those projected in this EIR, should be acknowledged as potentially significant negative impacts under CEQA and should be properly mitigated.

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Projected Changes in Travel Times, 12th St. Dam and Harrison St., Grand to 20th St (from Measure DD Draft EIR). **Note: All travel time is in seconds.**

Roadway Segment	Direction of travel	Hour	A: Existing travel time	B: Travel time—Existing plus Project (approx. 2010)	C: Travel time change from Existing to Existing plus Project Column B minus Column A	D: Travel time as of 2025 with cumulative development	E: Travel time change Existing plus Project to 2025 Column D minus Column B	F: Travel time change from Existing to 2025 Column D minus Column C
12th St., Madison St. to Foothill Boulevard	Eastbound toward Foothill	AM pk. hour	84.9	157.5	72.6	161.2	3.7	76.3
		PM pk. hour	114.9	199.0	84.1	270.0	71.0	155.1
	Westbound toward Madison	AM	170.8	291.7	120.9	364.4	72.7	193.6
		PM	164.0	265.4	101.4	273.1	7.7	109.1
Harrison St., 20th St. to Grand Avenue	Northbound toward Grand	AM	99.5	144.7	45.2	157.5	12.8	58.0
		PM	132.6	164.4	31.8	218.6	54.2	86.0
	Southbound toward 20th St.	AM	133.6	130.2	-2.6	164.7	34.5	31.0
		PM	136.1	134.0	-2.1	140.1	6.1	4.0

Potential Mitigations to Travel Time Impacts

The Value and Limitations of Transit Signal Priority

The EIR proposes (pp. 133 and 139) that transit signal priority be used along 12th Street to reduce AC Transit travel times. The EIR notes that "This action would reduce delays for AC Transit but would not completely eliminate increases in travel time along 12th Street and Harrison St.

AC Transit requested the use of transit signal priority in our NOP letter. We support signal priority on both corridors and believe it would be useful in reducing travel time. However, the improvements in travel time caused by transit signal priority would be insufficient to mitigate the level of delay indicated by the EIR for 12th St (Harrison St. is discussed in the last section of the letter).

20

As noted above, the volume of buses on the 12th Street Dam is very high, approaching one per minute (54 per hour) in the peak period. If the traffic signals tried to give

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priority to each bus, or even a large fraction of the buses on the roadway, the signals would be perpetually off-cycle and would never be able to reset to their normal cycle. Even with an aggressive signal priority protocol, most buses in the peak, when the roadway would presumably be most congested, would not be able to take advantage of it.

In addition, signal priority only reduces delay caused by signals. Signal priority by itself could not reduce delay caused by high traffic volumes and roadway congestion. We have clearly seen this limitation of signal priority in our operation of the San Pablo Avenue Rapid line (line 72R).

20 cont.

Additional Mitigations

Additional mitigations will be required to substantially reduce projected delay to an acceptable level and to mitigate the significant negative environmental impact that the delay in the current plan represents. AC Transit's proposed mitigations represent our best assessment, at this time, of effective mitigation measures. We have also considered how to minimize the effect of needed mitigations on other aspects of the Measure DD project.

AC Transit would be pleased to discuss these and/or other mitigations with the City of Oakland. Our goal is not necessarily to implement these specific mitigations, but rather to ensure that mitigations which would effectively reduce delay are implemented. In our letter on the Notice of Preparation for this EIR, AC Transit proposed these and similar mitigations. The City rejected all of our potential mitigations without providing adequate substitutes. Therefore, we now propose the following measures:

1. "Passive" transit signal priority - This would be in addition to the active signal priority of holding green lights and truncating red lights. In passive signal priority, signals are timed in the appropriate progression for buses rather than private cars. This system is used effectively on Market Street in San Francisco.

2. An Eastbound Bus lane in the 11th St. tunnel access to the roadway, with a dedicated bus signal at end of tunnel. This bus lane would be one of the existing three lanes, presumably the right lane. This approach would allow a bus to go around congestion in the 11th St. tunnel and move out of the tunnel quickly. Our preliminary evaluation is that this lane in the tunnel would obviate the need for a bus lane the full length of the roadway eastbound.

3. Westbound—A bus lane the length of the roadway. In the westbound direction, it does not appear possible to use queue jumps to circumvent congestion. Therefore we propose a dedicated bus lane for the approximately 1/3 mile length of the roadway. The lane should be approximately twelve feet wide. We do not believe that this would be an

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undue intrusion on park and recreational space adjacent to the planned six lane roadway.

4. Elimination of eastern crosswalk at the11th-12th/14th Street intersection The design for the new intersection of 11th Street, 12th Street, and 14th St. incorporates two crosswalks across the east-west roadways. However, the eastern crosswalk has the potential to cause substantial traffic delay, since use of the crosswalk would force all three roadways to stop. The crosswalk provides little pedestrian benefit, since it reaches an inactive, inaccessible area behind the Oakland Museum. The western crosswalk is very close to the eastern crosswalk. Eliminating this crosswalk and redesigning pedestrian paths to connect to the western crosswalk would also reduce the amount of paved surface in the area, which the City has raised as a concern.

21 cont.

As part of the process of developing a plan for effective operation across 12th Street, AC Transit is willing to consider relocation of stops and rerouting of bus lines in the area where useful and feasible.

Harrison Street, 20th Street-Grand Avenue

The impacts of the DD projects on Harrison Street between 20th Street and Grand Avenue present similar issues to those on 12th Street, albeit on a smaller scale. In this area, the City proposes to reconfigure the triangular intersections of Harrison Street, 20th Street, and Lakeside Drive into a single, perpendicular T intersection of Lakeside and Harrison. The number of lanes on Harrison Street would be reduced. We applaud the City's goal of improving access to the Lake in an area where it is currently difficult.

Four all day AC Transit lines operate through this segment; the 11 Oakland Ave., the 12 Grand, the 59 Piedmont, and the NL Macarthur. The NL is a limited stop Transbay trunk line operating every 15 minutes on weekdays, a line which AC Transit is working with the City to convert to Rapid service.

22

Additional delay would result from this project and the cumulative effect of other projects, particularly in the northbound direction. By 2025, northbound buses in the afternoon peak are projected to be delayed almost 1.5 minutes (86 seconds), and one minute in the morning peak (58 seconds).

We are seriously concerned about these delays. In addition, we are concerned about planning for this side of Lake Merritt proceeding in isolation from planning for the Grand-Macarthur Rapid. As noted above, this project would convert the existing NL to faster, more frequent Rapid service. AC Transit and the Alameda Congestion Management Agency developed a preliminary report on this proposal, and AC Transit now has adequate planning funds to develop a detailed plan for this Rapid. There are several outstanding issues in planning this area, such as the configuration of the roadway and the location of bus stops.

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Planning for the Measure DD project and the Grand-Macarthur Rapid in this area should proceed together. Otherwise, the City runs a very real risk of making costly changes and improvements which would need to be modified or eliminated later. We propose that no plan for Measure DD improvements in this area be finalized until the Grand-Macarthur Rapid plan is finalized.

22 cont.

AC Transit looks forward to continuing to work with the City of Oakland to structure projects which support both recreational and transit needs. If you have any questions about this letter, please contact Nathan Landau at 510-891-4792 or nlandau@actransit.org.

Yours Truly,

Nancy M. Skowbo

Nancy Skowbo
Deputy General Manager for Service Development

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LETTER A1
AC Transit
Nancy Skowbo, Deputy General Manager for Service Development
September 10, 2007

Response A1-1: The introductory statement expresses an opinion on the merits of the project and states that AC Transit supports several elements of the project, including the development of multi-use paths around Lake Merritt and improvements to the pedestrian environment. The transit agency's support for these elements will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-2: AC Transit states that it is "concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam." This potential impact of the project is identified in the Draft EIR but is determined to be less than significant for the reasons provided on page 130 of the document. Although the City did not find the impact to be significant, the City nevertheless shares AC Transit's concern. As noted on page 133 of the Draft EIR, the City will continue to work with the agency to find mutually agreeable solutions in the spirit of the Transit Street Cooperative Agreement, which the comment cites as an example of collaboration and cooperation between the City and AC Transit.

The comment concludes by stating that AC Transit has had ongoing and constructive discussions with the City's Public Works Department about impacts and mitigations for the 12th Street roadway reconstruction and believes that the City has largely responded to the agency's concerns about impacts that would occur during the construction phase of the project. The comment does not pertain to the Draft EIR's environmental analysis so not further response is provided.

Response A1-3: The comment incorrectly states that Measure DD would provide funds to develop a park in the former 9th Avenue Terminal area. The park and waterfront trail at the 9th Avenue Terminal would be developed as part of the Oak to 9th Project as indicated in the project description (Figure III-10a, for example) and would be funded by development fees paid by that project. The Measure DD Implementation Project proposes to fund improvements at Estuary Park, which is located on the opposing bank of the Lake Merritt Channel from the Oak to 9th development site.

Response A1-4: Elements of the 12th Street reconstruction that are presented in the Project Description of the Draft EIR are identified, including narrowing of the 12th Street roadway. The comment states that the transit agency understands the City's desire to reduce the large amount of roadway in that area, but that the narrower roadway must be balanced with the need to maintain viable transit operations. The Draft EIR describes and analyzes the potential impacts of the project on transit operations on page 133. The City of Oakland decision-makers will consider these impacts and the opinions of AC Transit on the need to balance the project's impacts and benefits during review of the merits of the project.

Response A1-5: The comment states that AC Transit is concerned about projects that would take place in the area of 20th and Harrison Streets and the impacts that they would cause to bus service in this area. The transportation analysis of the Draft EIR considered the impacts of the project in combination with past, other current and probable near-term projects scheduled to complete by Year 2025, including AC Transit's Bus Rapid Transit improvements. The results of the impact analysis for bus service, including travel times and speeds, in the area around 20th and Harrison Streets are presented on page 139 of the Draft EIR. As the comment does not identify specific impacts that are of concern to the agency, no further response is necessary. Refer to Response to Comment A1-22 for additional information about bus service in the vicinity of 20th and Harrison Streets.

Response A1-6: The comment indicates that the increases in travel time identified in the Draft EIR may underestimate the actual delay for buses to the extent that buses need to pull into and out of traffic flow for stops. The analysis that evaluated travel times along the 12th Street and Harrison Street corridors was performed to help understand how automobile, bus and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components. No specific consideration was given to how bus travel time would be affected by the need to pull into and out of traffic flow for stops. The design of bus stops along both corridors would be such that buses would at least partially block the right lane. Re-entry into the flow of traffic should not be a significant problem for AC Transit operations. Variations in the actual travel time for AC Transit vehicles (compared to the results reported in the Draft EIR) would result from bus stop access and from routes that use only part of the routes that were analyzed.

Response A1-7: The methodology for analyzing travel times is described on page 108 of the Draft EIR as the Highway Capacity Manual arterial analysis method. This method is described in detail in the *Highway Capacity Manual* (Transportation Research Board 2000). The projections were presented in more disaggregated form in Appendix E. No analysis was performed for midday traffic conditions because the peak hours coincide with the commuter peaks and the determination of likely effects would be greatest during those peaks. The midday analysis would not inform the determination of significance in the impact analysis and thus was not performed.

Response A1-8: The comment identifies bus lines that currently operate along 12th Street and states that if AC Transit's proposed Bus Rapid Transit system is developed it would also use the 12th Street corridor. The information provided by the comment is included on page 116 of the Draft EIR and was considered in the Draft EIR's analysis. No revisions to the Draft EIR are necessary.

Response A1-9: The Draft EIR discloses that converting 12th Street from a limited access high-speed facility to a mixed mode transportation system that accommodates pedestrian activity around Lake Merritt would result in increased travel times along 12th Street for both autos and transit vehicles. The CEQA impacts of increased delay and decreased LOS at intersections are addressed in the Draft EIR. Although the City

does not have CEQA significance criteria for roadway delays because it finds that LOS intersection analyses more accurately predict traffic impacts, the City studied the corridor to understand how the project would affect traffic travel times in the area.

The estimated delays along 12th Street are recognized as important to AC Transit operations and passengers using the service. As stated in the Draft EIR travel times for all modes of travel within the corridor would increase by a similar amount and travelers would not be discouraged from using transit as a result of the project. Increases in travel times from the passengers' perspective would be noticeable as would travel times for automobile users. The City acknowledges that this is a potential concern for drivers and transit passengers alike but not a CEQA impact. Refer also to Response to Comment A1-12.

Response A1-10: Regarding the costs to operate transit service, costs will increase with or without the Measure DD Implementation Project. The decision to increase service along a route could be affected by the demand along the route, the attractiveness of other modes of travel, and other factors. AC Transit could decide to adapt to the increase in travel time by changing the schedule rather than by adding buses.

The purpose of the travel time analysis was to determine how automobile, bus and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components. The purpose of the analysis was not to provide information sufficient for AC Transit to develop a precise estimate of the cost of adding service to the corridor.

Response A1-11: In response to the statement that the Draft EIR does not address the potential for aggregated impacts on the same bus routes as the Measure DD project elements, the Draft EIR included an assessment of projects that were considered to be reasonably foreseeable. The existing lanes were assumed to be in place for Foothill Boulevard. Further narrowing of the travel lanes on Foothill Boulevard is not considered to be reasonably foreseeable.

Response A1-12: The comment states that increased travel time would impact passengers that use AC Transit lines because their trips would take longer and they might miss transfer connections. The City acknowledges that this is a potential operational concern for AC Transit but not a CEQA impact. The CEQA impacts of increased delay and decreased LOS at some intersections are addressed in the Draft EIR.

Although the City did not find the impact on travel time through the 12th Street corridor to be significant, it nevertheless shares AC Transit's concern with regards to impacts to bus passengers. As stated on pages 133 and 139, the City considered several potential options that might reduce bus travel times, including the addition of bus-only lanes or queue jump lanes, and the elimination of crosswalks. These measures were not recommended because they would have substantial impacts on traffic operations or pedestrian mobility. The Draft EIR recommends implementing a transit signal priority system along some transit routes, which would reduce but

not completely eliminate increases in travel time. Refer to Response to Comment A1-21 for a discussion of additional measures recommended by AC Transit. These measures will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-13: Environmental justice does not fall under the definition of environmental impacts in CEQA and therefore is not within the purview of the Draft EIR. *CEQA Guidelines* Section 15064 states: "Economic or social changes resulting from the Project shall not be treated as significant effects on the environment." In addition, *CEQA Guidelines* Section 15131 indicates that the socioeconomic effects of a project should not be considered significant environmental impacts in and of themselves: "Economic effects of a project shall not be treated as significant effects on the environment. An EIR may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the Project to physical changes caused in turn by the economic or social changes. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes."

As required by CEQA, the Draft EIR focuses on the physical effects of the project, which include the increase in travel time. These effects were found to be less than significant for the reasons stated on pages 130 and 139 of the Draft EIR. Nevertheless, the City shares AC Transit's concern with regards to impacts to bus passengers. Refer to Response to Comment A1-21 for a discussion of additional measures recommended by AC Transit to reduce travel time. These measures will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-14: The comment states that policies in the City's Land Use and Transportation Element (LUTE) encourage transit and the movement of transit vehicles and that degradation of bus service, as described in the Draft EIR, would be inconsistent with the City's transit policies. While the project would increase bus travel time in the 12th Street corridor, as described on pages 129-133 and 138-140 of the Draft EIR, a potential conflict with a single policy in a General Plan element does not inherently result in a *significant* effect on the environment within the context of CEQA. In addition, the City's General Plan has numerous policies addressing transportation issues (presented on page 121 of the Draft EIR). Policy T3.3, for example, states that the City should accept lower levels of service and a higher level of traffic congestion at Downtown intersections and intersections that provide direct access to Downtown locations. Downtown is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south and I-980/Brush Street to the west. This area includes much of the 12th Street corridor. The project is consistent with this policy.

Because the General Plan contains many policies, which may in some cases address different goals, some policies may compete with each other. The overall consistency of the project with the City of Oakland's policies is evaluated in Section IV.B, Planning Policy and in Appendix D of the Draft EIR. The comment is noted and the City of Oakland decision-makers, in deciding whether to approve the proposed project, will consider this information when determining whether on balance the project is consistent with the General Plan.

Response A1-15: Refer to Response to Comment A1-9.

Response A1-16: The Draft EIR applies the City's criterion of significance for transit, which the City developed in cooperation with AC Transit, that states that the project would have a significant impact on transportation if it would "generate added transit ridership that would increase the average ridership on AC Transit lines by 3 percent at bus stops where the average load factor with the project in place would exceed 125% over a peak thirty minute period." There has been no dispute that the project would not satisfy that criterion. Delays that would affect motor vehicle operations in general would have a similar effect on AC Transit operations and no special operational measures for AC Transit were considered necessary under CEQA. The Draft EIR went a step further than the normal process in Oakland for assessing impacts under CEQA and addressed corridor travel time in the spirit of disclosing additional information. However, the travel time analysis does not address a specific criterion of significance and thus does not lead directly to impact determinations. Refer also to Responses to Comment A1-12 and A1-21.

Response A1-17: The comment states that passengers expect the bus to operate on its designated route, even if that route has been made slower. Although this is likely true, route designations are changed routinely by AC Transit to accommodate changes in demand and other factors including travel time. AC Transit could change the designation of one or more routes along 12th Street if it would result in improved service for a majority of riders.

Response A1-18: The City's adopted criterion to which the comment refers reads, "Fundamentally conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle routes)." The Draft EIR finds that the project would not fundamentally conflict with transit policies because among other reasons it encourages many forms of alternative transportation, including the use of buses, by improving pedestrian linkages through the creation of a more pedestrian friendly and accessible environment in the Lake Merritt project area, including the 12th Street transit corridor.

The Draft EIR acknowledges that the project would increase travel time along 12th Street for the bus routes that travel this corridor but the traffic analysis also shows that the delays at existing intersections along these routes would not be affected or delays would be reduced (i.e., at International Boulevard and 1st Avenue, see Table IV.C-5 on page 125 of the Draft EIR). Although no mitigation is required, the City will continue to collaborate and cooperate with AC Transit to identify ways to

reduce transit delays and improve service in the project area. Refer to Response to Comment A1-21.

Response A1-19: The comment states that AC Transit is "concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam," an impact of the project that is identified in the Draft EIR but is not considered significant for the reasons provided on page 130 of the document. Although the City did not find the impact to be significant, the City nevertheless shares AC Transit's operational concern. As noted on page 133 of the Draft EIR, the City will continue to work with the agency to find mutually agreeable solutions in the spirit of the Transit Street Cooperative Agreement, which the comment cites as an example of collaboration and cooperation between the City and AC Transit.

The comment correctly notes that transit bus travel times are impacted by poor intersection operations and that the impact compounds by traveling through congested corridors. While there is no significance criterion for bus transit travel times, the roadway changes identified as mitigation measures in the Draft EIR would reduce vehicle delay, which also then would reduce transit delay from unmitigated conditions. The intersection improvements identified in the Measure DD environmental studies would improve travel through the 12th Street area for all vehicles including buses, which make up 3 to 4 percent of the person trips and automobiles which make up the remaining person trips.

Response A1-20: It is acknowledged that providing transit signal priority along 12th Street and Harrison Street would be insufficient to fully mitigate the level of delay indicated by the EIR for 12th Street or Harrison Street. The Draft EIR states on page 133, "This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street." The Draft EIR states on page 139, ". . . the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and Harrison Street." Refer to Response to Comment A1-21 for additional recommendations the City is considering to reduce travel time.

Response A1-21: The City has evaluated the feasibility of implementing AC Transit's requested design modifications for reducing travel time along the 12th Street corridor and agrees to consider passive transit signal priority and changes to eastbound bus lanes. These design details do not substantially change the project and would not create new impacts.

The City declines to modify the bus lane in the westbound direction because the westbound bus lane would have significant implications for the project design, would be counter to project objectives (e.g., it would reduce the area of park land created), and would likely provide the least benefit for travel time of the measures proposed by AC Transit. Right-of-way constraints prevent widening the street east of the Lake Merritt Channel Bridge. Widening the bridge itself would reduce open water below, reduce open sky for pedestrians below and be very expensive. Without widening the Lake Merritt Channel Bridge a westbound bus lane could be

extended only from just west of the bridge to the 11th-12th/14th Street intersection. Parking would have to be eliminated on the north side of 12th Street between the bridge and the 11th-12th/14th Street intersection and the roadway would need to be widened into the park. The incremental reduction in travel time, which was not a significant impact of the project, does not justify the impacts (e.g., loss of parking, reduced size of park, etc.) that the requested change would make.

An analysis was performed to determine the extent to which the measures proposed by AC Transit could be implemented without causing significant intersection impacts. The following scenarios were evaluated:

1. Recommendations proposed in the DEIR (with refinements in signal phasing to better accommodate pedestrian movements)[1]

2. Bus lane on the 11th Street (with crosswalks proposed in the DEIR)

3. Bus lane on the 11th Street and elimination of southeast crosswalk

Scenarios 2 and 3 would provide continuation of the bus lane through the signal at the 11th-12th/14th Street intersection, after which buses would share lanes with other motor vehicles.

The analysis of traffic operations showed that a relatively long cycle length[2] would be required during the AM peak hour for all the scenarios above. The scenarios intended to at least partially accommodate AC Transit's request (No. 2 and 3, above) would require relatively long cycle lengths during the PM peak hour. The DEIR recommendation (No. 1, above) would allow a signal cycle half the long cycle during the PM peak hour.

A short cycle length is desirable for two reasons. First, short cycle lengths provide shorter wait times for pedestrians and result in better pedestrian compliance with traffic regulatory devices. Second, short cycle lengths generally result in shorter vehicle queue lengths than long cycle lengths.

To compare the DEIR recommendation with the other scenarios, a long cycle length was analyzed and would provide lower delay for motor vehicles than the shorter cycle length suggested to better accommodate pedestrians. The analysis showed that all scenarios could be implemented without causing significant level of service impacts at the 11th-12th/14th Street intersection. The results of the analysis

[1] The DEIR analysis assumed pedestrians would cross the southeast leg of the 11th-12th/14th Street intersection during the signal phase that would serve eastbound right turning traffic from 11th Street to 12th Street. The signal phasing concept was revised to provide a separate pedestrian phase that would provide a protected phase for pedestrians. Details of the revised signal phasing concept are provided in the Appendix.

[2] The DEIR analysis evaluated 50 and 100 second cycle lengths for the intersections along the 12th Street – 14th Street corridor. The analysis conducted for the updated analysis showed that a 100-second cycle length would be required during the a.m. peak hour but that a 50-second cycle length would be possible during the p.m. peak hour.

are summarized in the table, below. Detailed analysis worksheets are provided as Appendix A.

Intersection Levels of Service – Cumulative (2025) Conditions for 11th-12th St/14th Street Intersection

Scenario	AM Peak Hour		PM Peak Hour	
	LOS[a]	Delay[b]	LOS[a]	Delay[b]
DEIR Recommendation (50 second PM signal cycle)	B	14.6	D	37.8
DEIR Recommendation (100 second PM signal cycle)	B	14.6	C	28.2
Bus lane on the 11th Street	B	14.9	C	32.4
Bus lane on the 11th Street and elimination of southeast crosswalk	B	16.7	C	34.3

Notes:
[a] LOS = Level of Service
[b] Average control delay in seconds per vehicle
[c] Defined as a downtown intersection
Source: Dowling and Associates, 2007.

The City will work with AC Transit to determine the feasibility of implementing the measures included in the analysis. The bulleted list of recommendations on page 133 of the Draft EIR is revised as follows:

Transit Recommendations

- The City should provide <u>active and/or passive</u> transit signal priority to reduce travel times along 12th Street and Harrison Street. This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street.
- <u>The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.</u>

The bulleted list of recommendations on pages 139-140 of the Draft EIR is revised as follows:

<u>Transit</u> Recommendations

- Implementation of <u>active and/or passive</u> transit signal priority as described in the previous recommendations for transit service would reduce delays for AC Transit. Nevertheless, the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and Harrison Street. ~~While adding bus-only lanes or queue jump lanes, or eliminating pedestrian crosswalks are feasible, they are not recommended because they would have substantial impacts on traffic operations or pedestrian mobility, and in most cases have additional costs.~~

- The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.

Response A1-22: The comment states that the increases in transit travel time in the vicinity Harrison Street between 20th and Grand Avenue are of concern to AC Transit. It also recommends that planning should be coordinated for the Measure DD Implementation Project and the Grand-Macarthur Rapid Project. The City and AC Transit are engaged in ongoing discussions to resolve transit issues associated with their respective proposed projects, including the Measure DD Implementation and Grand-Macarthur Rapid Projects.

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Making San Francisco Bay Better

August 27, 2007

Elois A. Thornton
City of Oakland
Community and Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: BCDC Inquiry File No. AL.MC.7517.2. Juris. Det. File No. AL.AL.6000.3. Measure DD Implementation Project Draft Environmental Impact Report. (State Clearinghouse #2006122048.)

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Measure DD Implementation Project Draft Environmental Impact Report (DEIR) for the City of Oakland. The DEIR is dated July 2007, and was received in our office on July 24, 2007. The Commission has not reviewed the DEIR, so the following staff comments are based on the *San Francisco Bay Plan* (Bay Plan) and the McAteer-Petris Act and staff review of the DEIR.

Jurisdiction. Chapter IV, page 95 of the DEIR defines the BCDC jurisdiction as, "all areas of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways." It states that "Measure DD includes waterfront improvements within 100 feet of the shoreline," that will require BCDC permit approval. In addition to the above description of the BCDC jurisdiction, the EIR should state that the southern portion of the Lake Merritt Channel (to the 7th Street Pump Station) falls within The Commission's bay jurisdiction, and that Measure DD improvements involving placement or removal of fill in the Bay will require BCDC permit approval. **1**

It is not clear from the DEIR if the Measure DD improvements include an operational 7th Street tide or flood gate. If a tide or flood gate is not included, the EIR should recognize that changes may result to the Commission's jurisdiction in the Channel and Lake. **2**

Public Access. To be consistent with the discussion of other applicable regulatory documents in the Planning Policy section (Chapter IV, Section B), the EIR should reference the Bay Plan policies on Public Access that will apply in BCDC permits issued for Measure DD projects. **3**

Fish, Other Aquatic Organisms and Wildlife. BCDC's Bay Plan findings and policies on Fish, Other Aquatic Organisms and Wildlife address protection of these resources. The summary of the McAteer Petris Act in the Biological Resources section (page 204) of the EIR should also state that, in reviewing permit applications for projects within its jurisdiction, BCDC relies on these Bay Plan policies to ensure protection of biological resources. **4**

Tidal Marshes and Tidal Flats. BCDC's Bay Plan findings and policies also address Tidal Marshes and Tidal Flats. These policies state, in part, "Projects should be sited and designed to avoid, or...minimize adverse impacts on any transition zone present between tidal and upland habitats." Additionally, the policies require that "Any tidal restoration project... include clear **5**

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cont.

and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project."

The DEIR states on page 35 that, "Measure DD Implementation Project Components along the channel are intended to… restore wetlands," and Figure III-4 appears to indicate that restoration of tidal marsh is proposed for the Channel south of 7th Street. Proposed improvements at the 66th Avenue Gateway (page 57) also appear to potentially affect tidal marsh and transition zone habitat. The EIR should recognize Bay Plan policies on Tidal Marshes and Tidal Flats that will apply to these Measure DD project components. **5 cont.**

Sea Level Rise and Safety of Fills. Bay Plan findings and policies anticipate the need for planning associated with safety of fills and sea level rise. The Safety of Fills findings recognize that "Bay water levels are likely to increase in the future because of a relative rise in sea level… Relative rise in sea level is the sum of: (1) a rise in global sea level and (2) land elevation change (lifting and subsidence) around the Bay." Policy 5 states, in part, "…structures on fill or near the shoreline should be above the highest estimated tide level for the expected life of the project water level during the expected life of the project or be sufficiently protected by levees…" Additionally, Policy 6 states, "local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas or in areas that will become flood prone in the future, and that structures and uses that are approvable will be built at stable elevations to assure long-term protection from flood hazards." **6**

Projects in BCDC jurisdiction that involve bay fill must be consistent with the Bay Plan policies on the safety of fill and sea level rise. The EIR should include these Bay Plan policies in the Regulatory Framework discussion in Chapter IV, Section H (beginning on page 249).

Increased Tidal Action in Lake Merritt Channel. In the discussion of hydrology and water quality impacts (pages 261 and 263), the DEIR states that the replacement of culverts under 12th and 10th streets with clear-span bridges, and reconfiguration of the 7th Street channel would double (approximately) the flow rate through Lake Merritt Channel. Based on studies of the flow changes, the DEIR concludes that this "ability of the channel to convey more water out of the Lake…could alleviate flooding conditions." The EIR should specify what factors these studies analyzed to project future flow rates and flooding conditions. If the studies are based solely on past tidal ranges, they may not sufficiently describe potential flooding impacts. For example, combined conditions of increased tidal action on the Channel and Lake, storm surge and climate change-related sea level rise could affect flooding risk for the project area. The EIR should consider these additional factors in assessing the hydrology and water quality impacts of the Measure DD improvements. **7**

Additionally, the description of impacts to biological resources (beginning page 210), should address whether tidal flow changes to the Lake and Channel will significantly affect habitats in any of the project areas. **8**

If you have any questions regarding this letter, or any other matter, please contact Joe LaClair by phone at 415 352-3656 or email joel@bcdc.ca.gov.

Sincerely,

SARA POLGAR
Planner

LETTER A2
Bay Conservation and Development Commission (BCDC)
Sara Polgar, Planner
August 27, 2007

Response A2-1: The comment cites text on page 95 of the Draft EIR that defines the Bay Conservation and Development Commission's (BCDC) jurisdiction and recommends that the Draft EIR clarify the boundary of BCDC's authority in the southern portion of the Lake Merritt Channel. It also recommends that the Draft EIR state that project actions that involve placement or removal of fill in the Bay will require BCDC permit approval. The City agrees to make the recommended changes, which clarify the permit process for the project but do not alter the analysis or conclusions of the EIR. The third paragraph on page 95 of the Draft EIR is revised to include this information. Because this paragraph is revised in response to more than one comment refer to Response to Comment A2-3 below for the revised text.

Response A2-2: The comment requests that the Draft EIR clarify whether a tide or flood gate is included at 7th Street Pump Station. The second paragraph on page 36 of the Draft EIR is revised as follows:

This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. <u>The bypass channel would be designed and managed to retain the tidal and flood control functions of the pump station. To ensure that the flood control function of the 7th Street Pump Station is not compromised, the new bypass channel would include a hydraulic gate that would be closed when operation of the pumps is required to lower the water level in the lake.</u>

Response A2-3: The comment requests that the Draft EIR reference the Bay Plan policies on public access that will apply in BCDC permits. Accordingly, the Draft EIR on page 95 is revised as follows:

e. San Francisco Bay Plan. The San Francisco Bay Plan[9] (Bay Plan) is a policy tool that, under the provisions of the McAteer-Petris Act, allows the San Francisco Bay Conservation and Development Commission (BCDC) to "exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction," an area that includes all of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways associated with the Bay. The Bay Plan stipulates: "Any public agency or private owner holding shoreline land is required to obtain a permit from the Commission before proceeding with (shoreline) development." <u>The Bay Plan contains findings and policies that will apply in BCDC permits for Measure DD project components</u>

within the commission's jurisdiction. Examples of applicable policies include those related to public access, the placement and removal of fill in the Bay, sea level rise and the safety of fills, the protection of fish, other aquatic organisms and wildlife, and tidal marshes and tidal flats, among others. Implementation of the proposed project would require BCDC permit approval for development within the 100-foot shoreline band. Measure DD includes waterfront improvements within 100 feet of the shoreline~~.~~, including areas along the Oakland Estuary and the southern portion of the Lake Merritt Channel, downstream of the 7th Street Pump Station.

Response A2-4: The comment requests that the EIR state that, in reviewing permit applications for projects within its jurisdiction, BCDC relies on findings and policies on Fish, Other Aquatic Organisms and Wildlife in the Bay Plan to ensure protection of biological resources. The City agrees to include the findings and policy information and revise the Draft EIR on page 204 as follows:

(4) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to enforce this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters. In reviewing permit applications, BCDC relies on findings and policies on fish, other aquatic organisms and wildlife in the Bay Plan to ensure protection of biological resources.

Response A2-5: The comment requests that the EIR recognize that policies on tidal marshes and tidal flats will apply to Measure DD project components. The City agrees to include the additional policy information that BCDC will consider during the permitting process. Refer to Response to Comment A2-3 for revisions to the text.

Response A2-6: The comment requests that the EIR recognize that policies on sea level rise and the safety of fills will apply to Measure DD project components. The City agrees to include the additional policy information that BCDC will consider during the permitting process. Refer to Response to Comment A2-3 for revisions to the text. Refer to Response to Comment A2-7 for additional discussion of sea level rise.

Response A2-7: The 7th Street Pump Station provides flood protection for areas upstream of 7th Street by allowing water levels in Lake Merritt to be lowered during storm events that coincide with high tides. This function and the operation of the 7th Street Pump Station are described on pages 35 (Project Description) and 246 (Hydrology and Water Quality) of the Draft EIR. A hydraulic gate in the new bypass channel at the 7th Street facility would be closed when operation of the pumps is required to lower the water level in the lake, which currently occurs about 1 percent of the time (i.e., a few days per year). Rising average tidal levels downstream of the flood station may increase the frequency with which the pumps would need to operate but increased operation would not compromise their function. The text is revised as indicated in Response to Comment A2-2 to clarify the operation of the 7th Street Pump Station.

Under certain conditions the pumps currently lower the water level in the Channel faster than it can be replenished by flows through the culverts beneath 10th and 12th Street. Removal of the culverts at 10th and 12th Streets, lowering of the channel at 12th Street, and creation of an open channel in these areas as part of the project (page 35 of the Draft EIR) would improve the flow of water between the lake and the pump station. These actions would help alleviate upstream flooding by allowing the pumping system to operate more efficiently.

Coastal flooding is acknowledged as a potential impact on pages 246 and 261 of the Draft EIR. As with many facilities built near the shore of San Francisco Bay, rising sea levels associated with global climate change could ultimately affect the pump station if they rise to extreme levels. The pump station's function would be compromised if, for example, extreme high tides overtopped the facility. However, the flood control components and operation of the 7th Street Pump Station itself would not be altered by the project. In addition, the project is not constructing housing, high occupancy, or sensitive facilities within the zone that could be affected by rising sea levels. Thus, the impact of the project would be less than significant. The text at the bottom of page 261 of the Draft EIR is revised as follows:

- <u>As with many facilities built near the shore of San Francisco Bay, rising sea levels associated with global climate change could, in the long-term, affect project facilities and existing infrastructure such as the 7th Street Pump Station that are designed to protect them from flooding. The pump station's function would be compromised if, for example, tidal levels overtopped the facility. However, the flood control components and operation of the 7th Street Pump Station itself would not be altered by the project. New trails are being located above the current reach of tidal action, with additional freeboard which will accommodate some future sea level rise. In addition, the project is not constructing housing, high occupancy, or sensitive facilities within the zone that could be affected by flooding or rising sea levels.</u>

Response A2-8: Increased tidal flows would not cause adverse changes to the open water or upland habitats (described on pp. 188-189 of the Draft EIR) that occur in the vicinity of Lake Merritt or the Lake Merritt Channel. The increased tidal flows would have no effect on the upland habitat, which is landscaped parkland. The new flow regime would not *adversely* affect the relevant water quality characteristics of the open water habitat such as salinity, temperature and dissolved oxygen. Water quality would be improved by the greater exchange rate between Lake Merritt and the estuary and by newly created tidal wetlands. As the channel is not a corridor for the movement of migratory fish, the increased flow rate would have no effect on migratory fish species. The following text is inserted on page 216 of the Draft EIR at the end of subsection IV.F.2.c(3):

<u>The increased tidal flows that would occur as a result of the proposed modifications to the Lake Merritt Channel are not expected to cause adverse changes to the open water habitat in Lake Merritt or the Lake Merritt Channel. Increased tidal flows would not adversely affect the relevant water quality characteristics of the open water habitat such as salinity, temperature, and dissolved oxygen. Water quality, especially dissolved oxygen, would be improved by the greater exchange rate between</u>

Lake Merritt and the estuary and by newly created tidal wetlands in the channel, which would benefit wildlife.

The text at the beginning of subsection IV.F.2.c(4) on page 216 of the Draft EIR is revised as follows:

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. As the channel is not a corridor for the movement of migratory fish, the proposed changes to Lake Merritt and Lake Merritt Channel would not have an adverse effect on migratory fish species. Several species of migratory waterbirds have been observed using the Lake Merritt Channel during the winter (approximately October through March), often in flocks of 40 to 70 birds (e.g., scaup, common goldeneye). A 2004 study of waterbird use and disturbance response within Berkeley's Aquatic Park found that disturbance sensitivity was positively related to flock size, with large flocks flushing more readily than smaller ones.[37] Although no such studies have been conducted at the Lake Merritt Channel, LSA observed a flock of approximately 50 common goldeneyes swimming away from a group of schoolchildren crossing the pedestrian bridge during the January 19 site visit, indicating sensitivity to disturbance. Human-caused disturbance negatively affects wintering ducks by causing the expenditure of energy (i.e., flying or moving away from the source of disturbance) that would otherwise be used for behaviors necessary for survival, such as resting or feeding.[38] Repeated or periodic disturbance would cause a greater expenditure of energy and thus have a greater effect on wintering birds than singular events.

Letter
A3

COUNTY OF ALAMEDA
PUBLIC WORKS AGENCY
399 Elmhurst Street • Hayward, CA 94544-1307
(510) 670-5480

September 10, 2007

Ms. Elois A Thornton, Planner IV
City of Oakland,
Community and Economic Development Agency
Planning Division
250 Frank Ogawa Plaza, Suite 3315,
Oakland California 94612
Email: eathornton@oaklandnet.com
(510) 238-6284

RE: City of Oakland Measure DD Implementation Project
Environmental Impact Report (SCH # 2006122048

Dear Ms Elois:

The Alameda County Flood Control and Water Conservation District (District) has reviewed the City's Environmental Impact Report entitled: *City of Oakland Measure DD Implementation Project Environmental Impact Report* and has the following comments:

The District owns and maintains several flood control facilities within the proposed project limits. These facilities include, but not limited to, District designated Zone 12 Lines B, C, and Line D. These creeks for the most part, flow in underground culverts that outfall at Lake Merritt. In addition the District owns and operates a pump station located on the outfall channel at 7th Street crossing.

The proposed project *Group 1 Lake Merritt and Lake Merritt Channel Improvements* described in the EIR pages 27-29 Table III-1 of the EIR could potentially result in significant impacts to District facilities. The proposed reconstruction and construction of the retaining walls along the banks of Lake Merritt could potentially undermine the integrity of existing culvert outfalls. This is a significant construction related impact requiring mitigation. Please provide adequate explanation of how the City proposes to mitigate this impact. **1**

The District owned pump station at 7th Street crossing currently provides effective flood protection to a large area within and outside the proposed project limits. Modifications and changes proposed (described on page 39 and shown on Figure III-4 and in section g page 365 of the EIR) could significantly affect the pump station structure and operations; and on page 263 the EIR describes "doubling of the flow rate through the Lake Merritt channel". There are several potential ramifications to the changes proposed: **2**

1) The new bypass channels would potentially change the hydrology at the pump station requiring redesign and significant operational changes of the facility;
2) There is no clarification of how water levels in the bypass channel will be maintained to support boat traffic. The channel is under tidal ebb and flow.

Letter
A3
cont.

Comments –City of Oakland Measure DD EIR
Sept 10, 2007

3) The new bypass channels adjacent to the 7th Street Pump Station will require continuous maintenance. The EIR is unclear on how the City proposes to maintain the facility without compromising the flood protection functions of the pump station.
4) The District is concern about the potential safety and liability associated with the changes described in the EIR.

2 cont.

None of these significant issues requiring mitigation was adequately addressed in the EIR. In fact, it was concluded on page 258 in the checklist item that "it is less than significant". The District disagrees and requests that these issues be adequately addressed before approval of the EIR.

Under (*Group 4) City–Wide Creek Restoration, Preservation and Acquisition (described on pages 58 and on several other sections of the EIR).* The District is responsible for nearly all the major creeks and channel in the City of Oakland. Many of these creeks are located in high density population centers that may become prone to flooding with significant changes as described in the documents (i.e.; daylighting underground creeks). Potential impacts associated with this activity have not been addressed in the EIR. Please provide adequate mitigation. The District also requests that improvements and/or, restoration on any of these creeks that affect District facilities should be coordinated with the District hydrologist.

3

On pages 287-308: The EIR describes occurrences of high levels of various hazardous compounds, including lead at locations within the project limits. Yet no remediation other than citations of various local and state regulations governing these materials was provided. There is potential risk of these "localized" occurrences especially in the Lake Merritt Channel being transported (with tidal flows) into the lake with excavation and widening of the channel. This will potentially affect the wildlife resources occurring in the lake. Remediation is required.

4

The District requests copies of the technical studies for the 7th St. bypass channel concept including those prepared by Rajappan & Meyer Consulting Engineers 2007 *Lake Merritt conveyance capacity 1826-1827 Hydraulic modeling prepared for the City of Oakland 17 January.*

5

The District appreciates the opportunity to provide comments on the EIR and supports the overall goal of improving Lake Merritt and its environs. This comment letter is being sent electronically and by US Postal Services.

Yours truly,

Kwablah Attiogbe,
Environmental Services Supervisor

KA

LETTER A3
Alameda County Flood Control and Water Conservation District
County of Alameda Public Works Agency
Kwablah Attiogbe, Environmental Services Supervisor
September 10, 2007

Response A3-1: The comment states that the reconstruction and construction of retaining walls along the shore of Lake Merritt could potentially impact the integrity of the Alameda County Flood Control and Water Conservation District's underground culverts that outfall at Lake Merritt. The comment seeks assurance that these facilities will not be damaged during project construction activities. Implementation of the City's Uniformly Applied Development Standard Conditions of Approval for the project will ensure that District facilities are not be damaged.

The City's Conditions of Approval are incorporated as part of the project as explained on page 64 and 65 of the Draft EIR. Condition 75, provided on page 257 of the Draft EIR, requires that the City obtain all necessary regulatory permits and authorization from the District prior to construction and comply with all conditions issued by the District. Issuance of permits and compliance with the District's conditions will ensure that the District's facilities are not damaged. The last paragraph on page 261 of the Draft EIR is revised as follows to clarify this point:

Substantial quantities of new impervious surfaces, which could increase runoff rates and velocities (and potentially flooding), would not be created by Measure DD project components. The integrity and function of existing flood control and stormwater conveyance facilities operated by the Alameda County Flood Control and Water Conservation District, such as stormwater outfalls at Lake Merritt, would be ensured by obtaining permits and authorizations from the District prior to construction as required by Condition of Approval 75. ~~Construction of housing is not a proposed element of the project, and no new residential development would be subject to flooding.~~ Therefore, no substantial impact related flood hazard or redirection of flood water would occur with the proposed Measure DD components.

Response A3-2: The comment states that for the 7th Street Pump Station significant issues requiring mitigation were not adequately addressed in the Draft EIR. The comment identifies concerns that the new bypass channel at the 7th Street Pump Station could potentially change the hydrology of the pump station thereby affecting the safety and flood control functions of the pump station. The comment also requests clarification of how water levels would be maintained to support boat traffic.

The proposed modifications to the 7th Street Pump Station and Lake Merritt Channel are described on pages 35 and 36 of the Draft EIR. As noted therein, the 7th Street project components have been designed to the conceptual stage. The environmental analysis of the Draft EIR relied on studies prepared for this early stage of project development, including the hydraulic analyses cited on pages 261

and 263 of the Draft EIR. The studies, the hydraulic model of the Channel, and the conceptual designs were developed in close cooperation with Alameda County Public Works staff, including their hydrologist, design engineers, and operations staff. The studies conclude that the proposed modifications to the Lake Merritt Channel would improve flood control and safety. Therefore, no mitigation is recommended for these issues. Also refer to Response to Comment A2-2 for revised text that explains how the flood gate in the bypass channel would function.

Additional designs for the bypass of the 7th Street Pump Station are required and will be prepared before the project can be permitted and constructed. As required by Condition of Approval 75, structures within the floodplain or floodway, such as the 7th Street Pump Station, are subject to the regulatory permits and authorizations from the District. Compliance with the District's requirements would ensure that the flood control functions of the pump station are not adversely affected by the project. These studies would also be used to determine how water levels would be maintained for recreational boaters so as not to interfere with the flood control function of the pump station. To clarify that this process is required as part of the project, the text of the EIR is revised on pages 263 and 264 as follows:

These three components are designed to improve tidal exchange between Lake Merritt and San Francisco Bay by clearing and broadening the channel to approximately 100 feet at the outlet from Lake Merritt and at 10th Street. New clear-span bridges would be constructed after removal of existing culverts under 12th and 10th streets. ~~and by reconfiguring the channel at 7th Street~~, The proposed changes would ~~resulting in~~ approximately double~~ing~~ the flow rate through the Lake Merritt Channel in this area.[50, 51] These components are also intended to improve pedestrian and bicycle circulation in the area of the Channel, and along with other components, enhance and improve the environment of Lake Merritt and surrounding parks. Redesign of the Channel at the Lake Merritt Flood Control Station at 7th Street is at the conceptual design stage. As noted previously, hydraulic studies conducted at this stage of project development indicate that the proposed changes to the Lake Merritt Channel would help alleviate flooding conditions. Nevertheless, as required by Condition of Approval 75 this project component would be required to obtain all necessary permits and authorizations from the Alameda County Flood Control and Water Conservation District prior to construction to ensure that the operation of the flood control facilities at 7th Street would not be adversely affected by the proposed action. Topics of wildlife, aquatic life, vegetation, landscaping, creek restoration, U.S. Army Corps of Engineers Section 404 (filling and grading in wetlands) permitting, California Department of Fish and Game Section 1604 – Streambed Alteration Agreements, and San Francisco Bay Conservation and Development Commission (BCDC) requirements are addressed in the Biological Resources section of this DEIR.

Response A3-3: The comment incorrectly states that potential flooding impacts associated with the City-Wide Creek Restoration, Preservation and Acquisition Group have not been addressed in the Draft EIR. Flooding issues associated with all project components, including creek restoration, preservation and acquisition activities, are analyzed on page 261 of the Draft EIR. As noted therein, activities associated with the City-wide Creeks group of projects are intended, in part, to reduce flooding. In addition, the project incorporates numerous Conditions of Approval, as described on pages 253 to 257 of the Draft EIR, to ensure that project activities, including creek

restorations, will not create significant flooding impacts. Thus, the Draft EIR concludes that potential flooding impacts are less than significant.

The comment also requests that the City coordinate with the District's staff if creek restoration or improvement activities would affect District facilities. The studies, the hydraulic model of the Channel, and the conceptual designs upon which the analysis in the Draft EIR is based were developed in close cooperation with Alameda County Public Works staff, including their hydrologist, design engineers, and operations staff. The City will continue to coordinate with District staff during the permitting and authorization process as required by Condition of Approval 75, which is included as part of the project.

Response A3-4: The comment incorrectly states that the Draft EIR relies on local and State regulations to address the presence of hazardous compounds that may be encountered during construction. It also expresses concern that disturbance of contamination in Lake Merritt Channel could adversely affect wildlife in Lake Merritt and states that mitigation is required.

Several Conditions of Approval, which go beyond regulatory requirements, are identified on pages 298 and 299 of the Draft EIR. Conditions of Approval 50 and 52, for example, require the preparation of Phase I and Phase II studies and remedial actions, as necessary, conducted in consultation with local, State and federal environmental regulatory agencies. These Conditions of Approval are included as part of the project, as noted on pages 64 and 65 of the Draft EIR, and would reduce potential impacts associated with hazardous compounds in soil or other environmental media. Implementation of these measures would ensure that project activities do not adversely affect water quality and wildlife resources at Lake Merritt.

Response A3-5: The comment requests copies of the technical studies for the 7th Street bypass channel concept. The studies are part of the administrative record for the project, which is available at the City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315. The City has provided copies of the documents to the District as part of the earlier cooperative design process.

Letter
A4

EAST BAY
MUNICIPAL UTILITY DISTRICT

August 28, 2007

Elois A. Thornton, Planner IV
City of Oakland
Community and Economic Planning Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: Draft Environmental Impact Report for the City of Oakland Measure DD Implementation Project

Dear Ms. Thornton:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Draft Environmental Impact Report (EIR) for the City of Oakland Measure DD Implementation Project. EBMUD has the following comments.

WATER SERVICE

EBMUD's Central and Pressure Zone, with a service elevation range of 0 to 100 feet, and Aqueduct Pressure Zone, with a service elevation range of 100 to 200 feet, serve the area incorporated in the Measure DD Project. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine the costs and conditions of providing water service to the project. Engineering and installation of water mains and services requires substantial lead time, which should be provided for in the project sponsor's development schedule. **1**

Since several of the proposed project areas have a potential to contain contaminated soil and/or groundwater, the project sponsor should be aware that EBMUD will not install piping or services in contaminated soil or groundwater (if groundwater is present at any time during the year at the depth piping is to be installed) that must be handled as a hazardous waste, or that may be hazardous to the health and safety of construction and maintenance personnel wearing Level D personal protective equipment. EBMUD will not install piping or services in areas where groundwater contaminant concentrations exceed specified limits for discharge to the sanitary sewer system and sewage treatment plants. **2**

The project sponsor must submit copies to EBMUD of all known information regarding soil and groundwater quality within or adjacent to the project boundary and a legally sufficient, complete and specific written remediation plan establishing the methodology, planning and design of all necessary systems for the removal, treatment, and disposal of contaminated soil and groundwater. EBMUD will not design piping or services until

Letter
A4
cont.

soil and groundwater quality data and remediation plans have been received and reviewed, and will not start underground work until remediation has been carried out and documentation of the effectiveness of the remediation has been received and reviewed. If no soil or groundwater quality data exists, or the information supplied by the project sponsor is insufficient, EBMUD may require the project sponsor to perform sampling and analysis to characterize the soil and groundwater that may be encountered during excavation or EBMUD may perform such sampling and analysis at the project sponsor's expense. If evidence of contamination is discovered during EBMUD work on the project site, work may be suspended until such contamination is adequately characterized and remediated to EBMUD standards.

2 cont.

WASTEWATER

On page 325, second paragraph, please delete the sentences stating, "This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater process by EBMUD's Main Wastewater Treatment Plant." While there is available capacity during dry weather, this volume is meant to ensure adequate capacity during wet weather events. The phrasing in the Draft EIR incorrectly implies that EBMUD does not fully utilize the available capacity.

EBMUD's Main Wastewater Treatment Plant is anticipated to have adequate dry weather capacity to treat the proposed wastewater flow from this project, provided this wastewater meets the standards of EBMUD's Environmental Services Division. However, the City of Oakland's Infiltration/Inflow (I/I) Correction Program set a maximum allowable peak wastewater flow from each subbasin within the City and EBMUD agreed to design and construct wet weather conveyance and treatment facilities to accommodate these flows. EBMUD prohibits discharge of wastewater flows above the allocated peak flow for a subbasin because conveyance and treatment capacity for wet weather flows may be adversely impacted by flows above this agreed limit.

3

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD would request that the City of Oakland include in its conditions of approval a requirement that the project sponsor comply with the Landscape Water Conservation Section, Article 10 of Chapter 7 of the Oakland Municipal Code. EBMUD staff would appreciate the opportunity to meet with the project sponsor to discuss water conservation programs and best management practices applicable to the integrated projects. A key objective of this discussion will be to explore timely opportunities to expand water conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

4

Letter
A4
cont.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

David J Rehnstrom

FOR William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:TNS:sb
sb07_217.doc

LETTER A4
East Bay Municipal Utility District (EBMUD)
William Kirkpatrick, Manager of Water Distribution Planning
August 28, 2007

Response A4-1: The comment states that the City should coordinate with EBMUD as the project plans are finalized to determine the costs and conditions of providing water service to the project. The comment is noted.

Response A4-2: The comment states that evidence of remediation of known contamination or information to confirm the absence of contamination must be provided to EBMUD before the district will design or install pipelines for the project in potentially contaminated areas. The City's Standard Condition of Approval 50: Phase I and/or Phase II Reports and Standard Condition of Approval 52: Environmental Site Assessment Reports Remediation are included as part of the project as noted on page 303 of the Draft EIR. These Conditions of Approval require the completion of an environmental investigation and remedial action prior to the initiation of ground-disturbing activities within the project site. Implementation of the Conditions of Approval would ensure that EBMUD workers or other construction personnel would not face health risks from soil or groundwater contamination during the installation of water or sewer lines. Data on soil and groundwater contamination with the Project site will be submitted to EBMUD prior to the installation of utility lines.

Response A4-3: The comment states that the Draft EIR mischaracterizes EBMUD's utilization of its available treatment capacity and recommends deletion of text to correct the error. The comment also notes that the City and EMBUD have agreed to design and construct wet weather conveyance and treatment facilities to accommodate the wastewater flows set forth in the City's Infiltration/Inflow (I/I) Correction Program. The comments are noted and the City agrees to make the recommended change. The comments and the recommended change to the text do not alter the analysis or conclusions of the Draft EIR. The second paragraph on page 325 of the Draft EIR is revised as follows:

Wastewater generated by the Measure DD Implementation Project components represents less than 0.1 percent of the MWWTP's secondary treatment capacity. ~~This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater processed by EBMUD's Main Wastewater Treatment Plant.~~ EBMUD has sufficient capacity to treat wastewater flows from the projects during dry weather[19] and would not require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

Response A4-4: EBMUD requests that the City include water conservation measures in its Conditions of Approval for the project in accordance with the Landscape Water Conservation Section of the City's Municipal Code and that the City meet with EBMUD to discuss water conservation programs and best management practices. The comment is noted and will be considered by the City of Oakland decision-makers during review of the merits of the project.

Letter
A5

East Bay Regional Park District

2950 PERALTA OAKS COURT P.O. BOX 5381 OAKLAND CALIFORNIA 94605-0381 T. 510 635 0135 F. 510 569 4319 TDD. 510 633 0460 WWW.EBPARKS.ORG

September 5, 2007

City of Oakland
CEDA Planning Division
Attn: Elois A. Thornton
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: EAST BAY REGIONAL PARK DISTRICT COMMENTS ON THE DEIR PREPARED FOR THE MEASURE DD IMPLEMENTATION PROJECT

Dear Ms. Thornton:

Thank you for providing East Bay Regional Park District with a copy of the Draft Environmental Impact Report for the Measure DD Implementation Project. The District currently maintains and operates Martin Luther King Jr. Regional Shoreline where a segment of the San Francisco (SF) Bay Trail spans from just south of the Hanson Aggregate property to 66th Avenue. Currently under construction at the northern portion of the Shoreline, between East Creek Point and the Hanson Aggregate property, is an improved segment of the Bay Trail, landscaping, picnic areas, a wildlife observation/fishing pier, a service yard, paved entry road, parking lot and other appurtenant facilities necessary to serve these improvements. A portion of this area will be leased by the Oakland Strokes rowing club for the construction and operation of new boating and security facilities for the club.

The District has identified as a priority in its adopted Master Plan the completion of missing sections of the SF Bay Trail and is pleased that the "Waterfront Trail and Access Improvements" (Group 2) component of the Measure DD implementation project is intended to connect Martin Luther King Jr. Regional Shoreline to Estuary Park and Jack London square via the SF Bay Trail. With more than 1,000 miles of trail within Alameda and Contra Costa County, the District has extensive knowledge and expertise in trail design, maintenance and operation. Recognizing the District's interest in the successful completion of Oakland's waterfront trail and the project's compatibility with the District's existing facilities at Martin Luther King Jr. Regional Shoreline and plans for expansion of the SF Bay Trail, the District believes a coordinated effort between the City and the District is essential for the success of the project. From reviewing the project description in the DEIR, it appears that details are yet to be worked out for the final trail design, alignment, and trail maintenance/

1

Board of Directors

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Nancy Skinner, Ward 1
Pat O'Brien, General Manager

Letter
A5
cont.

operation. The District requests that the City coordinate these details with the District as the project proceeds to design stages of development. The District's comments on the DEIR are related to these concerns and are as follows: **1 cont.**

Trail Design Specifications:

The DEIR does not provide sufficient detail for the design of the proposed trails to determine compatibility with existing segments of the Bay Trail (DEIR, P-52). In the absence of detailed design specifications for each new segment of trail, there could be a potential design conflict between the proposed future trails and their connections with existing trails. Acknowledging that these details cannot necessarily be worked out in the DEIR, to avoid this potential conflict, the District recommends that the City set forth design standards in the DEIR that will ensure trail design compatibility with existing trail specifications of the District and Bay Trail. The DEIR acknowledges that intergovernmental coordination for open space planning with East Bay Regional Park District is an adopted policy under the City's Open Space, Conservation and Recreation (OSCAR) General Plan Element (OSCAR, Policy OS-6.1). The District's trail details and Bay Trail Design Guidelines would be appropriate design standards to reference to ensure the compatibility of the future trail with existing trails. Coordination with the District on the final design of these trail segments will also ensure compatibility of the new segments of trail with existing trails. To facilitate this coordination, the City should engage the District early in the trail development and design process and submit plans for review by the District prior to commencing construction. **2**

Continuous Bay Trail:

Acquisition of land and construction of trail segments to complete the SF Bay Trail along the Oakland Estuary and establishment of a continuous waterfront parkway are identified as project objectives (DEIR page 25). Figures III-10a and III-10b which are meant to show the project area for waterfront trail and access improvements (Group 2 projects), do not show a continuous path resulting from completion of the project. Specifically, there appears to be gaps between:

1) Livingston Pier to the Cryer Site;
2) Park Street Bridge to Derby Avenue;
3) US Audio/Capture Technologies to High Street Bridge;
4) Gallagher & Burk/Hanson Aggregate to East Creek point.

3

In order to demonstrate that the project is consistent with the project objectives, the EIR should include a graphical exhibit / map that shows how the project will result in a continuous waterfront parkway. The graphic should provide sufficient detail to inform the public of thetype of trail (Class I, II or III) and note whether it is existing or part of the proposed project. Known gaps in the trail should be identified so as to not confuse the public as to where future segments of the Bay Trail are still missing.

Letter
A5
cont.

Hanson Aggregate Interim Connection:

The District currently operates and maintains the segment of the SF Bay Trail located south of the Hanson Aggregate property to 66th Avenue / Martin Luther King Jr. Regional Shoreline and previously commented on the Notice of Preparation for the project that it was exploring the possibility of a non-motorized bicycle and pedestrian route connecting the Bay Trail to High Street via Tidewater Avenue. The District is still exploring this as an option for the interim alignment of the SF Bay Trail.

The District supports Oakland's efforts in continuing the Bay Trail along the shoreline at the Gallagher & Burk/Hanson Aggregate trail segment. Recognizing this alignment may not be feasible in the short term, the District would like to see the Tidewater Avenue alignment considered as an interim route for the continuation of the SF Bay Trail northward as briefly mentioned in the project description (DEIR p. 57) and alternatives analysis (DEIR p. 359) of the DEIR. The final alignment for this trail segment will require a trail configuration which does not adversely affect operations of the Gallagher & Burk/Hanson Aggregate facility. **4**

Trail Maintenance:

Expansion of trails and enhancement of facilities will result in more intense use by the public versus pre-project conditions even though the project will not directly cause an increase in population. Trail user safety issues arising from poorly maintained trails are foreseeable indirect impacts of the park/trail expansion and should be a factor in evaluating applicable policies adopted by the City for ensuring that parks are adequately maintained for the safety of its users. Foreseeable hazards may include the presence of loose gravel & fallen debris; cracks; potholes; rough surfaces; flooding/drainage issues; lifting/sinking of trail surfaces; overgrown vegetation constraining the width of the trail & obstructing site visibility; and vandalized/broken bollards & security gates/fencing allowing for vehicular access to the trail.

The City's Open Space Conservation and Recreation (OSCAR) element of the General Plan identifies policies and action items that, if implemented, would ensure that parklands/trails are properly maintained. Implementation of these policies and action items would ensure that the new park/trail improvements will not deteriorate over the life of the project and pose a safety hazard to users. The City has adopted the following policies for the purpose of ensuring public safety for users of the Parks/Trail facilities, and for this reason, the District believes are relevant in the DEIR's analysis of applicable policies: **5**

1. Action REC-1.5.1: Adoption of a citywide park plan (OSCAR p. 4-32) - *A Parks and Recreation Master Plan is needed to guide decisions regarding the delivery of services and programs, and the expenditure of funds for operations, maintenance, and capital improvements.*

2. Policy REC – 4.1: Systematic Maintenance Provisions (OSCAR p. 4-46) - *Provide for ongoing, systematic maintenance of all parks and recreational facilities to prevent*

Letter
A5
cont.

deterioration, ensure public safety, and permit continued public use and enjoyment. Routine maintenance needs should be evaluated on a regular basis. Parks which receive very heavy use should receive more frequent maintenance than those with lesser use.

3. Action REC-4.1.1: Priority on maintenance - *Establish an annual budgeting process within the Office of Parks and Recreation which assigns a very high priority to park maintenance.*

4. Action REC-4.1.2: Improvements which reduce maintenance costs - *Undertake improvements and upgrades at Oakland parks which reduce annual maintenance costs. Physical hazards arising on trails and park facilities are typically a result of deferred maintenance which is directly tied to City funding/resource allocation.*

5 cont.

The above policies, if properly implemented, would address any indirect physical change in the environment that may occur from the project with respect to trail hazards resulting from deferred maintenance of the proposed improvements. The DEIR should give the status of the implementation of these policies/actions and using these policies, provide for long-term funding for maintenance of the trails to avoid potential hazards to trail users. This will help the DEIR provide information to the public to enable it to understand and evaluate potential indirect environmental impacts associated with insufficient levels of service for maintenance of the new facilities.

The District is pleased that the City of Oakland shares in its vision to close the gaps in the SF Bay Trail along the Oakland shoreline and looks forward to working cooperatively with the City on making this project a success. Thank you for the opportunity to review and comment on the DEIR and the City's consideration of the District's comments. If you have any questions or comments, please contact me at (510) 544-2627.

6

Sincerely,

Chris Barton
Senior Planner
Environmental Review/GIS Department

cc: Brad Olson, Environmental Programs Manager
Jim Townsend, Trails Program Development Manager

Letter A5
East Bay Regional Park District
Chris Barton, Senior Planner
September 5, 2007

Response A5-1: This introductory statement to the Park District's comment letter identifies the District's interest in the proposed Waterfront Trail component of the Measure DD Implementation Project. The Park District requests that the City coordinate these details with the District as the project proceeds to design stages of development. The comment is noted.

Response A5-2: The comment requests that the District's trail details and Bay Trail Design Guidelines be used as design standards to ensure compatibility of the future trail with existing trails. The comment also notes that the City has an adopted policy in its Open Space, Conservation and Recreation (OSCAR) General Plan Element that encourages intergovernmental coordination for open space planning with the Park District. The comments regarding design criteria and intergovernmental coordination do not address the Draft EIR's environmental analysis or identify a new impact of the project. These comments will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A5-3: As the comment notes, the purpose of the figures is to show the project area for the Waterfront Trail Group of the Measure DD Implementation Project. The "gaps" between the project areas are either complete or will be completed by others. The segment of trail between the Lake Merritt Channel and the 10th Avenue Marina is the only incomplete portion of the trail outside of the project area. It will be completed as part of the Oak to 9th Project, as shown on Figure III-10a. The trail is already complete at the other locations cited by the comment, that is, from the Livingston Pier to the Cryer Site, from the Park Street Bridge to Derby Avenue, from U.S. Audio Technologies to High Street and from the Gallagher & Burk/Hanson Aggregate property to 66th Avenue. The text of the Draft EIR is revised to clarify the status of the various segments of the Waterfront Trail outside of the limits for the Measure DD Implementation Project. Figures III-10a and III-10b are revised as shown on the following pages. The text on page 52 of the Draft EIR is revised as follows:

a. General Trail Characteristics. Most of the 6.6 miles of trail would be paved with asphalt or concrete, with minimal grading so as to minimize disturbance of the ground surface. At some locations, invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. Some portions of the existing Bay Trail between Jack London Square and 66th Avenue may be repaired to fix broken pavement, lighting, or signage. The trail would vary from a minimum 12-foot-wide combined use trail where space is constrained to a pair of bike and pedestrian signage would be installed along the trail.

LSA

N

0 500 1000
FEET

LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

SEGMENT OF WATERFRONT TRAIL THAT IS COMPLETE

FIGURE III-10a

Oakland Measure DD
Waterfront Trail North

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
I:\RAJ0606 measure dd\RTC\RTC Figures\Fig_III10a.ai (11/5/07)

LSA

N

0 500 1000
FEET

LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

SEGMENT OF WATERFRONT TRAIL THAT IS COMPLETE

FIGURE III-10b

Oakland Measure DD
Waterfront Trail South

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
I:\RAJ0606 measure dd\RTC\RTC Figures\Fig_III10b.ai (11/5/07)

Some segments of the trail are already complete or will be completed as part of other projects. These segments include:

- Lake Merritt Channel to 10th Avenue Marina – segment will be completed as part of the Oak to 9th Project.
- Livingston Pier to Cryer Site – trail segment is complete
- Park Street Bridge to Derby Avenue – trail segment is complete
- U.S. Audio Technologies to High Street – trail segment is complete
- Gallagher & Burk/Hanson Aggregate to 66th Avenue Gateway – trail segment is complete, except for the northern-most portion

Response A5-4: The comment expresses support for completion of a portion of the Waterfront Trail in the vicinity of the Gallagher & Burk/Hanson Aggregate facility, either as described in the project description or, as an interim measure along Tidewater Avenue as described in the alternatives analysis. The comment is noted and will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A5-5: Section B, Planning Policy, of the Draft EIR discusses how goals and policies from the City's General Plan are considered during the environmental review of the project. Goals related to recreation are presented in this section of the Draft EIR on page 93; relevant policies are presented in Appendix D.

The comment is correct in that the project would result in more intense use of trails by the public than the pre-project condition and that implementation of the City's policy for maintaining parks and recreational facilities would address any indirect physical change in the environment that may occur from the project with respect to trail hazards resulting from deferred maintenance. The project is not in conflict with this policy. Although the Measure DD funds would not be used for ongoing repair and maintenance, some funds would be used for renovating existing trails and other recreational facilities, which would reduce the need for maintenance in these areas over the short and mid-term. Future maintenance funds would be derived from the City's general fund and the Landscape Lighting and Assessment District.

As recommended by the comment, the text of the EIR is revised as follows to include the policy from the City's Open Space Conservation and Recreation (OSCAR) General Plan Element with regards to maintenance:

Policy Rec-4.1	**Systematic Maintenance Provisions.** Provide for ongoing, systematic maintenance of all parks and recreational facilities to prevent deterioration, ensure public safety, and permit continued public use and enjoyment. Routine maintenance needs should be evaluate on a regular basis. Parks which receive very heavy use should receive more frequent maintenance than those with less use.	*Lake Merritt and Lake Merritt Channel:* The project provides funding to renovate the Boathouse, Pergola, 18th Street Pie, which are consistent with the long-term upkeep of parks and recreational facilities. *Waterfront Trail:* The project provides funding to renovate existing trails as well as to construct new trails. *Recreational Facilities:* The project provides funding to renovate Studio One. *City-wide Creeks:* N.A.

Consistency with the many goals and policies in the City's General Plan will be considered by the City of Oakland decision-makers during review of the merits of the project.

Response A5-6: The comment states that the Park District supports the City's vision to close gaps in the Waterfront Trail. The District's support for this element of the project is appreciated and will be considered by City of Oakland decision-makers during review of the merits of the project.

Letter
A6

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

September 10, 2007

Ms. Elois A. Thornton
City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

ALA000223
SCH#2006122048

Dear Ms. Thornton:

Case No. ER 06-0017: Measure DD Implementation Project – Draft Environmental Impact Report

Thank you for continuing to include the California Department of Transportation (Department) in the environmental review for the proposed project. The comments presented below are based on the Draft Environmental Impact Report (DEIR) for the project referenced above. 1

The Department on behalf of Union Pacific Railroad is proposing to relocate one of the existing railroad bridges over the Lake Merritt Channel. This relocation is proposed to replace the rail capacity that will be impacted by a proposed nearby freeway project.

Traffic Impact Analysis

The document did not include a Traffic Impact Analysis or supporting technical documentation for project trips; thus we are unable to verify traffic conditions discussed in the DEIR. It is unclear how much traffic would be generated or distributed, and to which streets, and how much this traffic would contribute to the cumulative impact. The reconfiguration of local streets has significant impacts to ramp intersections regardless of trip generation. 2

We are concerned about the designation as "significant and unavoidable" for the impacts of Group 1 (Pages 137, 138, Impacts TRANS-5 through TRANS-9). The intersections named are either ramp intersections or adjacent intersections. The cost to widen these intersections and/or acquire right-of-way (ROW) should be considered since there are other significant projects included in the "cumulative plus project conditions" that should also be able to contribute fair share funds to mitigate these impacts. 3

Given the significant impact at the 7th Street and Oak Street intersection, we are also concerned about the ramp intersections at 6th Street and 5th Street. The impact to these intersections should be analyzed. 4

Letter
A6
cont.

The proposed sports complex will be located adjacent to Interstate 880 and the 98th Avenue interchange; what is the impact to the ramps and intersections? **5**

Cultural Resources

The Cultural Resources section in the DEIR is well done and satisfies environmental compliance for cultural resources within state ROW. However, if construction activities take place within State ROW during this project and there is an inadvertent archaeological discovery, the Department's Office of Cultural Resource Studies shall be immediately contacted at (510) 286-5618. A staff archaeologist will evaluate the finds within one business day after contact. **6**

Encroachment Permit

Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: Michael Condie, Mail Stop #5E. **7**

Should you have any questions regarding this letter, please call Lisa Carboni at (510) 622-5491.

Sincerely,

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

Letter A6
California Department of Transportation (Caltrans)
Timothy Sable, District Branch Chief
September 10, 2007

Response A6-1: The comment regarding the California Department of Transportation's (Caltrans) proposed replacement of the Union Pacific Railroad (UPRR) bridges over the Lake Merritt Channel as part of a proposed nearby freeway project does not raise a specific issue regarding the environmental analysis in the Draft EIR so no further response is provided.

Response A6-2: The comment states that the document did not include a Traffic Impact Analysis or supporting technical documentation for project trips. Only the Recreational Facilities (Group 3) element of the project would generate automobile travel in the traditional sense. Trip generation for Group 3 is shown in Table IV.C-9 on page 143 of the DEIR. The number of auto trips for Group 3 was calculated for AM and PM peak weekday conditions and for Saturday peak conditions. Because of the characteristics of Group 1 and Group 2 elements of the project, no analysis of trip generation was required to provide a traffic impact analysis.

The Lake Merritt and Lake Merritt Channel (Group 1) element of the proposed project would affect transportation systems as a result of the changes proposed in travel lanes and roadway geometry around Lake Merritt. Group 1 was evaluated by comparing the results produced by the Alameda Countywide Travel Demand Model for the existing roadway configuration against the proposed changes in the roadway configuration. No-project traffic volumes were modified to account for the changes in traffic patterns predicted by the travel demand model. A quantitative traffic impact analysis resulting from the changes in traffic patterns associated with Group 1 components is documented in the Draft EIR on pages 122 through 140.

The Oakland Waterfront Trail and Access (Group 2) would close gaps along the San Francisco Bay Trail between Jack London Square and 66th Avenue in East Oakland and would not affect traffic operations on other transportation systems. Group 2 is not expected to change automobile travel demand but required the assessment of potential impacts on transportation systems where the trail may cross existing streets. A qualitative evaluation of Group 2 impacts was documented on pages 140 to 141.

In response to the comment that it is unclear how much traffic would contribute to the cumulative impact, all traffic volumes for cumulative conditions with and without the Group 1 element of the project are documented in Appendix E and the contribution to the cumulative impact is provided on pages 133 through 140.

In response to the comment that the reconfiguration of local streets has significant impacts to ramp intersections regardless of trip generation, the impacts of the Group 1 element of the project on ramp intersections was disclosed by the analysis of the following intersections, which are all connected to I-580 ramps:

- Santa Clara Avenue / Grand Avenue
- Macarthur Boulevard / Grand Avenue
- Lake Park Avenue / Lakeshore Avenue
- Macarthur Boulevard / Lakeshore Avenue

The traffic analysis in the Draft EIR concluded that traffic shifts caused by the proposed project would not significantly affect other freeway ramps.

Response A6-3: The comment incorrectly states that Impacts TRANS-5 through TRANS-9 were found to be significant and unavoidable. Impacts TRANS-5 through TRANS-7 were found to be significant and unavoidable; Impacts TRANS-8 and TRANS-9 were found to be significant but can be reduced to less-than-significant levels with the recommended mitigation measures. The comment states that the City should consider obtaining fair share funds from other projects that contribute to the impacts. The City is aware that other projects contribute to the impacts at the intersections and will pursue all appropriate methods of funding. The source(s) of project funding does not fall under the purview of CEQA and is not within the purview of this response document.

Response A6-4: Although the comment expresses concern that ramp intersections at 6th and 5th Streets (at I-880) might be significantly impacted, the analysis showed that traffic volumes on 7th Street south of Oak Street would not be affected (as shown by comparing the traffic volumes shown in Appendix E – Figures A.3 and A.4).

Response A6-5: In response to the question about the impact of the proposed sports complex to the ramps and intersections near I-880, the analysis was performed at a program level using the methods appropriate for a CMP analysis, as stated on page 143 of the Draft EIR. Roadway links on I-880 and local streets were evaluated and impacts were found to be less than significant. No intersection or ramp analysis was performed. The Draft EIR disclosed that I-880 would operate at LOS F during the peak hour but that the addition of sports complex traffic would not be significant. Similarly, the link level of analysis found that the sports complex would not have significant impacts on local streets.

Response A6-6: The comment provides contact information for Caltrans' Office of Cultural Resources in the event there is an archaeological discovery within State right of way during Measure DD Implementation Project construction activities. The City appreciates the contact information and will notify Caltrans as required when working within State right of way.

Response A6-7: The City will obtain necessary encroachment permits from Caltrans and appreciates the information describing Caltrans resources that are available to assist with the permit process.

Letter
A7

STATE OF CALIFORNIA — Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

August 31, 2007

Elois Thornton
City of Oakland
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: Measure DD Implementation Project, SCH# 2006122048

Dear Ms. Thornton:

There are some very serious problems that do need to be addressed regarding bicycle and pedestrian circulation in the vicinity of Lake Merritt channel near the UP tracks. The DEIR suggests that an at-grade crossing may be one alternative, however, UP and CPUC staff would adamantly oppose an at-grade crossing. Without a grade separated crossing near the channel, pedestrians and cyclists will most likely use the 5th Avenue at-grade railroad crossing, which is not designed to accommodate non-motorists, and even with significant upgrades would still be a hazardous location for pedestrian and bicycle traffic. **1**

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Terrel Anderson, Union Pacific Railroad

Letter A7
California Public Utilities Commission (PUC)
Kevin Boles, Environmental Specialist
August 31, 2007

Response A7-1: The comment states that the California Public Utilities Commission and the Union Pacific Railroad (UPRR) oppose an at-grade crossing of the UPRR tracks in the vicinity of the Lake Merritt Channel and that without a grade separated crossing at this location, pedestrians and cyclists would likely use the 5th Avenue crossing. The comment claims that the 5th Avenue crossing is hazardous and suggests a grade separated crossing near the channel or safety improvements at the 5th Avenue crossing. The proposed bicycle and pedestrian connections between I-880 and the Oakland Estuary are not part of the proposed project and no at-grade crossing in the vicinity of the Lake Merritt Channel is proposed. Streetscape improvements to 5th Avenue, not part of the Measure DD project, are in the initial planning stage, and could potentially include safety improvements at the existing at-grade crossing.

The trail along the Lake Merritt Channel currently ends south of the 7th Street Bridge and this would not change as part of the project. On the east side of the Channel the trail merges into the parking lot south of the Peralta College District offices; on the west side of the Channel, the trail passes under I-880 and connects to the dead end of 4th Street. Bicycle and pedestrian access to the estuary from the Downtown and Lake Merritt areas of Oakland would continue to be served by 5th Avenue, Oak Street (currently a bike route, Class 3), or other connections in the vicinity of Jack London Square. Both 5th Avenue and Oak Street are identified as proposed bike lanes (Class 2) in the City's proposed 2007 Bicycle Master Plan. The rail line crossings at these locations currently include safety features (i.e., automatic gates and flashing signals) and further improvements to the crossings (e.g., striped lanes and signage) would be included as part of other projects to upgrade these bicycle connections.

The Draft EIR acknowledges that several issues would need to be resolved before a crossing of the railroad tracks along the Lake Merritt Channel is implemented, including agreements with UPRR and the Public Utilities Commission. The resolution of improving trail connectivity in this area is not part of the Measure DD Implementation Project, as noted on page 129 of the Draft EIR. Completion of the trail connection along the channel would likely require subsequent environmental review once a project is defined. The City will work with UPRR and the Public Utilities Commission to ensure the safety of pedestrians and bicyclists should a new crossing of the UPRR tracks be proposed.

To clarify where the trail would end south of 7th Street, the text on pp. 35-36 of the Draft EIR is revised as follows:

As part of the Measure DD Implementation Project, the City proposes to widen the Channel, streambed, stream banks and upland areas between Lake Merritt and the Estuary by removing the 10th Street culvert and 12th Street culvert (discussed above) and grading the Channel's banks, thus creating additional areas of open water and tidal marsh as shown in Figure III-4. The bottom of the channel at 12th Street would be lowered. Shoreline improvements (e.g., pedestrian pathways and tidal marsh) along the channel between 12th Street and I-880 would be similar in design to those ~~to the designs~~ proposed for the 12th Street project component. The existing pedestrian bridge below 10th Street would be refurbished or replaced. At 7th Street, the pedestrian tunnel on the east side of the trail would be refurbished and the pedestrian tunnel on the west side would be relocated to allow construction of the new bypass channel. A new traffic signal and crosswalk across 7th Street is proposed. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. The trail south of 7th Street would be refurbished but would otherwise remain unchanged. On the east side of the Channel the trail merges into the parking lot south of Peralta College District offices; on the west, the trail passes under I-880 and connects to the dead end of 4th Street.

The City will ~~is proposing to~~ remove some existing trees (approximately 58) along the channel as shown in Figure III-5. Invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline and new intertidal and upland plantings consisting of native plants such as pickleweed (lower marsh areas), marsh gumplant, and salt grass (upper marsh areas and transitional zones characterized by native grasses), and shrubs and trees would be planted to restore the natural ecosystem of the Channel. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. The City also is proposing to install biofiltration basins to improve water quality. Typical construction activities would include clearing, grading, excavating, pile driving, and replanting of landscaping using various pieces of construction equipment and by hand labor. ~~This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt.~~

Letter
A8

From: Sulouff, David [David.H.Sulouff@uscg.mil]
Sent: Friday, September 07, 2007 1:38 PM
To: Thornton, Elois
Subject: MEASURE DD, LAKE MERRITT & PROPOSED BAY TRAIL

Ms. Thornton:

We completed our preliminary review of the DEIR for the subject project.
Proposed navigational impacts were not adequately addressed. When the applicant begins working with the Coast Guard for Bridge Permitting issues, the environmental document, as drafted, with be inadequate for our use. **1**

Attached is a .pdf of our previous correspondence on the topic.

Thank you,
David H. Sulouff
Chief, Bridge Admin
Eleventh Coast Guard District
Bldg 50-2 Coast Guard Island
Alameda, CA 94501
(510) 437-3516

Letter
A8
cont.

U.S. Department of Homeland Security
United States Coast Guard

Commander
District Eleven

U. S. Coast Guard Island, Bldg. 50-2
Alameda, CA 94501-5100
Staff Symbol: (dpw)
Phone: (510) 437-3516
Fax: (510) 437-5836

16590
Oak Inner Tidal Canal (5.6)
January 16, 2007

City of Oakland
Attn: Elois A. Thornton
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Madam:

Please include the Coast Guard Bridge Office concerning the Measure DD Environmental Impact Report (EIR) Project, for all bridge related issues over existing or proposed navigable waters of the United States. **2**

The General Bridge Act of 1946 requires that the location and plans for bridges over navigable waters of the United States be approved by the Commandant, U. S. Coast Guard prior to commencing construction. The Oakland Inner Tidal Canal and the Oakland-Alameda Estuary are considered to be navigable waterways of the United States for bridge administration purposes. Coast Guard Bridge permitting is subject to the National Environmental Policy Act. **3**

Lake Merritt and the portion of Lake Merritt Channel upstream from the impoundment are presently not considered navigable for bridge permitting purposes. However, alteration of the waterway to allow vessels to navigate between the lake and the estuary would result in a change to the determination and existing or proposed bridges would become subject to Coast Guard Jurisdiction. **4**

Applications for bridge permits should be addressed to Commander, Eleventh Coast Guard District, Bridge Section, Bldg 50-2, Coast Guard Island, Alameda, CA 94501. Applications are available on-line at: http://www.uscg.mil/hq/g-o/g-opt/g-opt.htm. The application must be supported by sufficient information to permit a thorough assessment of the impact of the bridges and their immediate approaches on navigation and the environment. We recommend discussing the proposed impacts of procedures for constructing, altering or demolishing bridges. The Environmental Impact Statement should also contain data on the number, size and types of vessels using or projected to use the waterway. **5**

We appreciate the opportunity to comment on the project in this early stage. I can be contacted by telephone at (510) 437-3516 if additional information is needed.

Sincerely,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
By direction of the District Commander

Copy: San Francisco Corps of Engineers
CG Sector, San Francisco

Letter A8
United States Coast Guard
David H. Sulouff, Chief, Bridge Section
September 7, 2007

Response A8-1: The City considered the project's design features and the operation of the bridges when determining whether the project would create a safety hazard or impede marine transportation. As noted on page 56 of the Draft EIR, to the extent feasible, the undercrossings of bridges along the Waterfront Trail would not extend beyond the existing pierhead line. The trail would remain as close to the existing bridge abutments as possible to ensure public safety and not impede navigation. Further, the bridge undercrossings would not impede marine transportation or create a significant safety hazard because to allow passage of marine vessels at High and Park streets, both the north and south ends of the bridges are raised, with marine vessels passing through the opening near the midpoint of the Tidal Canal. At Fruitvale Avenue, the south end (Alameda side) of the bridge is raised, with marine vessels passing through the opening south of the midpoint of the Tidal Canal. The proposed trail undercrossing would be beneath the fixed northern section (Oakland side) of the Fruitvale Bridge, which remains lowered during vessel passages. Thus, the City concludes that the proposed design of the bridge undercrossings would allow adequate room for the passage of marine vessels and would not create a safety hazard for pedestrians and bicyclists or impede marine shipping. See Photoplate 1 on the following page, which show the bridges in the open position during the passage of marine vessels.

However, the City recognizes that the U.S. Coast Guard and the shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail, particularly at the High Street and Park Street bridges, and that the U.S. Coast Guard has permitting authority in this area. For this reason, and others, the City proposes to pull the proposed boardwalk closer to the shore at the High Street and Park Street bridges, so that the channel is not narrowed any further. Also the City proposes an alternative to the project that does not include the passage of the Waterfront Trail beneath the bridges. That alternative is described and analyzed in Section V.F of the Draft EIR (pp. 356-359).

To clarify the City's conclusions regarding safety and shipping in the Oakland Channel the text on page 142 of the Draft EIR is revised as follows:

Traffic <u>and Maritime</u> Hazards. Implementation of the proposed project would result in the Bay Trail passing under the bridges. Therefore, the project would not result in any significant impacts related to traffic hazards as the trail would not conflict with vehicular circulation. <u>To the extent feasible the proposed trail segments that would pass beneath the Park Street and High Street bridges would not extend further into the channel than the existing bridge fenders. At all bridges, trail segments would be kept as close to the shoreline as necessary to ensure public safety and not impede</u>

Photoplate 1: Barge Passage along the Oakland Inner Harbor Tidal Canal

Alameda side — Park Street Bridge — Oakland side

Oakland side — Fruitvale Bridge — Alameda side

Alameda side — High Street Bridge — Oakland side

navigation. However, the U.S. Coast Guard and others have raised concerns about the potential safety and feasibility of a trail being constructed under the bridges, particularly the High Street and Park Street bridges. Recognizing that the U.S. Coast Guard has permitting authority in these areas, the City includes street-level crossings in these areas as part of the alternative for the Waterfront Trail Group, described in Section V.F, Waterfront Trail Surface Street Connection Alternative.

The comment also resubmits comments made when the Notice of Preparation was issued. While these comments are not specific to the Draft EIR, as they were submitted in advance of its publication, they are nevertheless addressed by Responses to Comments A8-2 through A8-5.

Response A8-2: Copies of the Draft EIR and the Notice of Availability were sent to Mr. Sulouff as part of the noticing process for the EIR. Refer also to Response to Comment B4-1.

Response A8-3: The comment regarding the permitting authority of the U.S. Coast Guard is noted. The City understands that the U.S. Coast Guard must comply with the requirements of the National Environmental Policy Act (NEPA) and will work with the U.S. Coast Guard to prepare the required documentation, as needed.

Response A8-4: The comment regarding the effect of the proposed action on the U.S. Coast Guard's jurisdiction over areas upstream of 7th Street is noted. As the comment does not relate to the environmental analysis within the Draft EIR so no further response is provided.

Response A8-5: The City appreciates the information provided in the comment for obtaining and completing U.S. Coast Guard bridge permit applications and the contents of the permit application and supporting NEPA documentation. The City will prepare the required applications and work with the U.S. Coast Guard to prepare NEPA documentation, as needed.

B. ORGANIZATIONS AND INDIVIDUALS

Letter
B1

Golden Gate Audubon Society
2530 San Pablo Avenue, Suite G • Berkeley, California 94702
Phone: (510) 843-2222 • Fax: (510) 843-5351 • Email: ggas@compuserve.com
Americans Committed to Conservation • A Chapter of the National Audubon Society

September 7, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR (Case No. ER 06-0017)

Dear Ms. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Draft Environmental Impact Report (DEIR). The (GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly, as we stated in our letter dated January 4, 2007 (a copy of which is reproduced in Appendix C of the DEIR), which we submitted in response to the NOP for this environmental review, the GGAS is in general strongly supportive of the projects described in the DEIR.

In the GGAS's letter in response to the NOP, we identified two respects in which the projects described in the DEIR have the potential to degrade or otherwise have an adverse impact on the regionally significant waterfowl habitat that the Lake Merritt Channel (LMC) supports: 1) noise, movement of heavy construction equipment, and other construction-related disturbances associated with the implementation of proposed improvements at the 7th, 10th and 12th street crossings of the LMC, and 2) disturbance associated with the opening of the LMC to small boat traffic. We called upon the City to carefully evaluate these potential impacts and develop appropriate mitigation measures to minimize them. **1**

We are pleased to see that in § IV.F.2.c(4) (p. 217) the DEIR proposes a mitigation measure (Impact BIO-4 (Group 1)) in the form a seasonal closure of the LMC to small boat traffic in order to minimize the adverse effects on the LMC's wildlife habitat that such traffic might otherwise cause. We recommend that the measure be clarified by specifying that the "small boat use" of the LMC that would be allowed **2**

Letter
B1
cont.

during the non-migratory season is limited to nonmotorized use. With this clarification, we fully concur in this measure. **2 cont.**

However, we disagree with the reasons that the DEIR gives for its conclusion that construction-related impacts on the LMC's wildlife habitat are "less than significant." The DEIR correctly acknowledges that "construction activities at the LMC (e.g., grading, demolition of existing culverts, tree removal) during [the period when waterbirds are most abundant (approximately October through March)] would disturb waterbirds by causing them to fly away…." The DEIR further acknowledges that such disturbance "negatively affects wintering ducks by causing the expenditure of energy…that would otherwise be used for behaviors necessary for survival, such as resting or feeding." The DEIR's conclusion that such effects are "less-than-significant" because the affected wildlife can simply "relocate to nearby areas," is inconsistent not only with the DEIR's own analysis of the effects of human disturbance on waterfowl, but also with the "work window" for pile driving (Impact BIO-2 (Group 2)) that the DEIR recommends to avoid the adverse impacts that such activity would otherwise have on fish habitat in the Oakland Estuary. At least in the absence of evidence that adoption of one or more similar "work windows" for the Measure DD-funded projects in or adjacent to the LMC is infeasible, the GGAS believes that adoption of such measures is called for. **3**

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers

John Bowers
Member, East Bay Conservation Committee

LETTER B1
Golden Gate Audubon Society
John Bowers, Member, East Bay Conservation Committee
September 7, 2007

Response B1-1: This introductory statement expresses an opinion on the merits of the project and notes that the project will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. The Society's support for these elements will be considered by City of Oakland decision-makers during review of the merits of the project. The comment also identifies issues raised in the Society's comments on the Notice of Preparation. Refer to Responses to Comments B1-2 and B1-3.

Response B1-2: The comment recommends restricting small boat use of the Lake Merritt Channel to non-motorized vessels during the non-migratory season. As this restriction is not required to mitigate a significant effect of the project the measure is not included as mitigation. However, the Society's recommendation will be considered by City decision-makers during review of the merits of the project.

Response B1-3: The Draft EIR's analysis of impacts is consistent. When determining whether the project would have an adverse effect on wildlife species, the City considered both the intensity and duration of the project activity. In the case of migratory fish that may be present in the Oakland Estuary, potential exposure to the percussive sound waves produced by pile driving, although brief, could injure or kill protected fish species. Thus, the risk of injury or death is high and mitigation is recommended. On the other hand, pile driving in the Lake Merritt Channel may temporarily displace migratory waterbirds to other nearby areas of suitable habitat but the birds are not at risk of being injured or killed by the activity. Thus, the Draft EIR did not find this to be a significant adverse effect.

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Oaks California Oak Foundation

Our mission is to protect and perpetuate native oak woodlands

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September 10, 2007

City of Oakland Planning Commission
Oakland City Hall
250 Frank Ogawa Plaza
Oakland, Ca 94612

Ladies and Gentlemen:

At a time when every tree matters in the fight against Global Warming, please consider carefully before you approve the Final EIR which will remove more than 250 trees from our City's Lake Merritt and the Lake Merritt Channel. **1**

Attached is a paper which fully describes the implications of existing trees for wildlife habitat. Also enclosed is a recent settlement in California Attorney General's challenge to urbanizing area to include Global Warming considerations in their planning. **2**

Thank you for your attention to this important matter.

Sincerely,

Janet Santos Cobb, President

Enclosures

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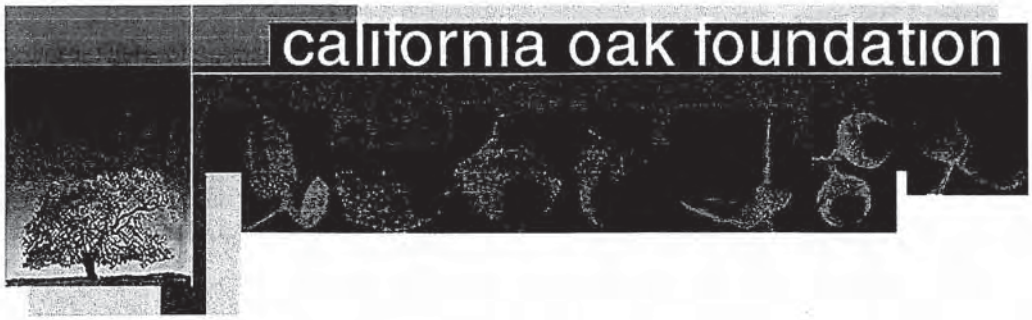

September 2007

California Oak Report

Oaks & Climate Change

California Attorney General Edmund G. Brown, Jr. (AG) has reached a landmark lawsuit settlement with San Bernardino County involving the extent to which the County's environmental impact report for its General Plan update should address impacts on climate change. This is the first time any California jurisdiction has entered into a legally binding agreement to look at the overall impact of its planning on global warming.

The agreement solidifies climate change as an impact to be addressed in California Environmental Quality Act (CEQA) environmental review documents. Significant impacts to oak woodlands must be addressed in CEQA green house gas reviews because oak impacts uniquely combine carbon capture and carbon emission issues.

According to the AG, discretionary approvals must provide: (1) An examination of a project's impact on climate change and the adoption of all feasible mitigation measures to reduce such impacts, and (2) such analysis can – and must – be done today even absent established thresholds of significance or impending regulations under Assembly Bill 32. The state's California Climate Action Registry, which will guide AB 32 regulations, recognizes that converting oak woodlands to development is a carbon emission due to lost forest photosynthesis. Moreover, many municipal and county codes have general or specific tree-related provisions that reference air quality, air pollution or climatic conditions.

Consistent with the CEQA opinions of the AG, where significant oak resource impacts occur, project air quality analyses must consider three oak resource factors: (1) How much carbon is sequestered in the impacted oak trees?; (2) How much potential carbon sequestration will be lost due to oak seedling, sapling and tree impacts?; (3) How much sequestered carbon will be released if the impacted oaks are burned?

The CEQA Oak Woodlands Dilemma

The oak woodlands circumstances are unique for each CEQA project. Unfortunately, project oak woodland mitigation measures consistently fail to provide proportional habitat mitigation. The basic problem is a failure to see the forest for the trees, exemplified by the fact that invariably mitigated negative declarations and environmental impact reports biologically analyze oak woodlands but mitigate for individual oak trees.

<u>On-Site Conservation Easement Mitigation</u>

Impact avoidance through on-site oak woodlands conservation easement serves only to limit the degree of significant oak woodland impacts and the project applicant's oak woodlands mitigation responsibilities. An on-site oak preserve amounts to nothing more than a promise not to further remove or fragment the remnant oak resource; these preserves do nothing to proportionally mitigate for the actual impacts from removing project site oak habitat.

Placement of an oak woodlands easement within a development is of marginal habitat value and also creates a potentially hazardous fire condition. Residual or planted oaks are at great risk of future loss through new Cal Fire fuel reduction regulations and increasingly stringent fire insurance policy standards.

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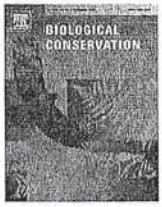

Scattered trees are keystone structures – Implications for conservation

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ABSTRACT

Scattered trees are prominent features in many landscapes worldwide, including natural landscapes, cultural landscapes, and recently modified landscapes. The ecological importance of scattered trees is widely acknowledged in natural landscapes, but has not been sufficiently appreciated in human-modified landscapes. This paper shows that scattered trees are keystone structures in a wide range of landscapes. At the local scale, ecological functions of scattered trees include: provision of a distinct microclimate; increased soil nutrients; increased plant species richness; increased structural complexity; and habitat for animals. At the landscape scale, ecological roles include: increased landscape-scale tree cover; increased connectivity for animals; increased genetic connectivity for tree populations; and provision of genetic material and focal points for future large-scale ecosystem restoration. Furthermore, in disturbed landscapes, scattered trees often are biological legacies that provide ecological continuity through time. In combination, these ecological functions support the argument that scattered trees are keystone structures. That is, their contribution to ecosystem functioning is disproportionately large given the small area occupied and low biomass of any given tree, and the low density of scattered trees collectively. Because scattered trees fulfill unique functional roles in a wide range of scattered tree ecosystems, their loss may result in undesirable ecological regime shifts. A key management challenge in all landscapes with scattered trees is to maintain a balance between recruitment and mortality of trees in an appropriate spatial pattern. Meeting this challenge may represent an important step towards the genuine integration of conservation and production in human-modified landscapes.

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> *"The way things look is not always the way things are. This fact should be cause for consternation among those who are interested in the management of ecological systems. A highly functional landscape structure may go unnoticed - even by people who depend upon its function"* (Nassauer, 1992, p. 239).

1. Introduction

Ecosystems with scattered trees occur throughout the world. The origins and ecological roles of scattered trees in natural ecosystems have been intensively studied in many parts of the world, including in the Brazilian Cerrados (Furley, 1999),

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Venezuelan Trachypogon savanna (San José et al., 1991), African savannas (Belsky, 1994), arid rangelands in South Australia (Facelli and Brock, 2000), oak savannas in North America (Nuzzo, 1986) and the forest-tundra transition zone of the boreal forest (Sirois, 1992). Scattered trees are also prominent features of many human-dominated landscapes, including recently cleared landscapes in Central America (Guevara et al., 1992), Africa (Duncan and Chapman, 1999) and temperate Australia (Ozolins et al., 2001), well-established cultural landscapes such as the dehesas in Spain and Portugal (Díaz et al., 1997) or British wood-pastures (Peterken, 1996), and severely disturbed forest landscapes (Gibbons and Lindenmayer, 2002). In this paper, these systems are collectively referred to as "scattered tree ecosystems". This definition is intended to be broader than that of "savanna" (sensu Bray, 1960), and includes natural, cultural and recently modified, as well as disturbed and undisturbed ecosystems (Fig. 1). The key defining feature of scattered tree ecosystems is the dispersed pattern of the trees. Scattered trees are referred to by various synonyms in different areas, including isolated trees (Dunn, 2000), pasture trees (Otero-Arnaiz et al., 1999), paddock trees (Law et al., 2000), and remnant trees (Guevara et al., 1986).

In this paper, scattered tree ecosystems are categorized into three groups for the purposes of discussion: (1) natural (such as savannas), (2) cultural (such as wood-pastures), and (3) recently modified (such as remnant paddock trees in south-eastern Australia) (Fig. 1). The distinction between cultural and recently modified scattered tree ecosystems is that the former have a long-term history of manipulation by humans and have been sustained by cultural systems over a long period of time. In contrast, the latter are recently modified, and often highly modified, and levels of tree cover are often declining. In reality, the distinction between the three categories will be blurred, and both natural and cultural scattered tree ecosystems can be highly modified. Similarly, levels of human modification and natural disturbance often interact, and scattered tree ecosystems therefore occur on a continuum from natural through to recently modified.

Despite large differences in climate and origin, scattered trees in natural, cultural and recently modified landscapes share many key ecological roles as well as several threats to their continued existence. However, especially in modified landscapes, the ecological value of scattered trees has rarely been recognized. The aims of this paper are to:

(1) demonstrate the keystone role of scattered trees;
(2) synthesize key ecological functions of scattered trees and highlight parallels between natural, cultural and recently modified ecosystems;
(3) establish common threats to scattered trees, especially in human-dominated landscapes; and
(4) outline ways in which scattered trees might serve as a landscape management tool to integrate conservation and production in human-modified landscapes.

By outlining the similarities between scattered trees in natural, cultural and recently modified ecosystems, this paper aims to facilitate increased recognition of the importance of scattered trees in modified landscapes. It is argued that native scattered trees exert a disproportionate effect on ecosystem function in a wide range of ecosystems, and that their loss therefore may lead to the deterioration of important ecosystem functions.

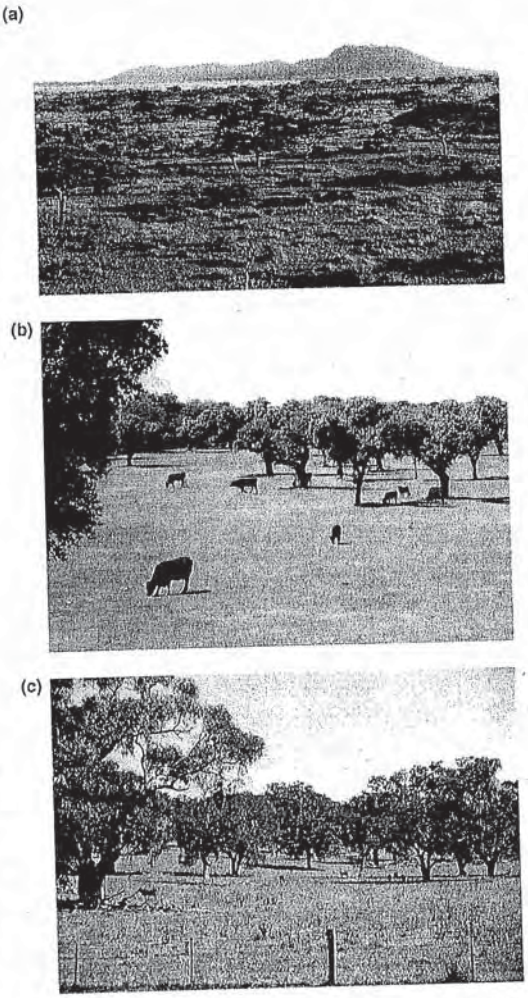

Fig. 1 – Three landscapes with scattered trees, representing a continuum of alteration states: (a) a natural landscape in southern Africa (top; photo by R. Heinsohn), (b) a cultural landscape in southern Spain (middle; photo by D. Gilmour, copyright IUCN), and (c) a recently modified landscape in south-eastern Australia (bottom; photo by A. Manning).

2. Scattered trees are keystone structures

A large amount of evidence demonstrates a wide range of important ecological functions of scattered trees in many natural, cultural, and recently modified landscapes (reviewed in detail below). In various different ecosystems, several authors

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have independently noted the "keystone" role of scattered trees, for example, in the Negev desert in Israel (Munzbergova and Ward, 2002), and in dehesas in Spain (Plieninger et al., 2003). Tews et al. (2004a,b) considered scattered trees in African savannas as "keystone structures" because:

> *"[A] wide array of species groups (e.g. arthropods, birds or mammals) depend on [scattered] trees as a food resource, shelter or nesting site. Consequently, overall species diversity is strongly linked to the quality of this structure"* (Tews et al., 2004a, p. 87).

Given many parallel functions of scattered trees across a broad spectrum of vastly different ecosystems, native scattered trees should be recognized as keystone structures in a wide range of landscapes, including natural, cultural and recently modified landscapes. Furthermore, some traditional agroforestry systems using non-native and domesticated tree species can also have important ecological and socio-cultural values (see Herzog, 1998, regarding the European "Streuobst" agroforestry system where fruit trees are undersown with crops or managed grassland). Analogous to the keystone species concept (reviewed by Power et al., 1996), scattered trees are keystone structures because they have a disproportionate effect on the ecosystem relative to the small area occupied and low biomass of any given tree and the low density of scattered trees collectively. It is precisely because scattered trees are not part of a large consolidated patch, that their local and landscape effects are pronounced. In an ecosystem otherwise dominated by ground cover vegetation, a single scattered tree will add a raft of additional or enhanced functions (Fig. 2). In contrast, when part of an existing large patch of trees, the addition of a single tree is less likely to add new functions not already fulfilled by other existing trees.

To maintain functioning ecosystems, it is widely recognized that priority should be given to species that fulfill unique functional roles rather than functionally redundant species (Walker, 1992; Elmqvist et al., 2003). The raft of roles fulfilled by scattered trees suggests that the notion of functional uniqueness should be extended beyond species to include structural features, such as scattered trees. Given the lack of alternative features that could fulfill similar ecological functions to scattered trees, the ability of scattered tree ecosystems to maintain their essential characteristics directly depends on the ongoing existence of scattered trees. Scattered trees are threatened in many modified landscapes (see below). These threats, in combination with the functional uniqueness of scattered trees, suggest that many scattered tree ecosystems are in a precarious state (for example, British wood-pasture, Kirby et al., 1995). That is, their resilience to further disturbance is low, and they are at risk of undesirable regime shifts (for discussions of precariousness, resilience and regime shifts see Folke et al., 2004; Walker et al., 2004). In the following section, various ecological functions of scattered trees are outlined which support the argument that scattered trees are keystone structures.

3. Functions of scattered trees

In natural, cultural and recently-modified landscapes, scattered trees fulfill many functions. The following sections

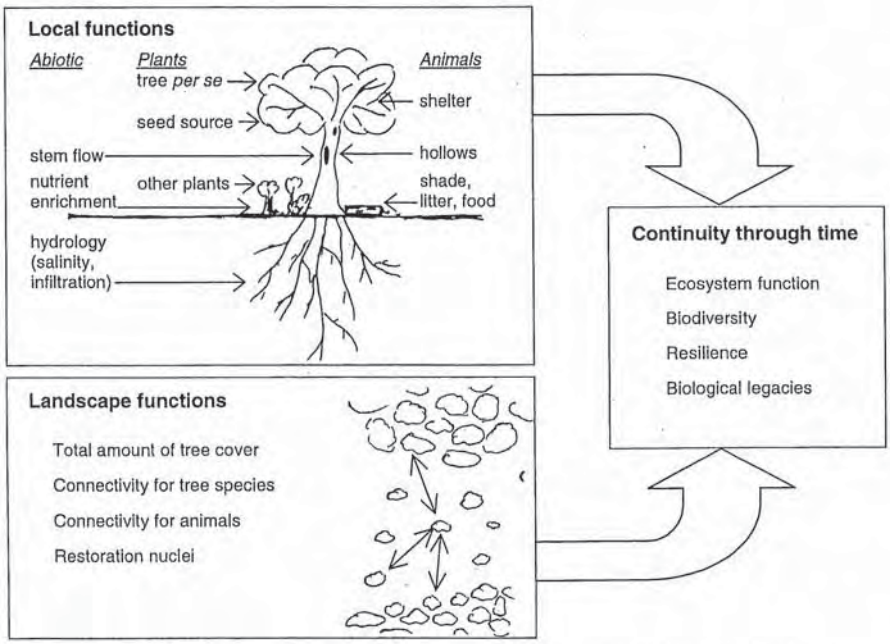

Fig. 2 – Schematic summary of some key ecological functions of scattered trees.

Table 1 – Examples of direct benefits from scattered trees to humans in modified landscapes

Benefit	References
Provision of ecosystem services (sensu Daily, 1997) which are essential for farming	This paper
Provision of fruit in many tropical landscapes	Aguilar and Condit (2001)
Wood products like firewood, fence posts and charcoal	Joffre et al. (1999), Pulido et al. (2001)
Shade and sheltered grazing for livestock	Kirby et al. (1995), Harvey and Haber (1999), Reid and Landsberg (1999), Quelch (2002)
Fodder for livestock in Britain	Peterken (1996)
Preservation of family traditions and real estate values in dehesas	Plieninger et al. (2004)
Recreational value for walkers and hunters in Scotland	Kirby et al. (1995), Quelch (2002)

consider: (1) the local-scale ecological functions of individual trees, (2) their role as biological legacies in modified landscapes, and (3) landscape-scale ecological functions of multiple scattered trees. In addition, examples of direct benefits from scattered trees to humans are given in Table 1.

3.1. *Local-scale ecological functions of scattered trees*

At the local scale, a given scattered tree influences its abiotic environment as well as plant and animal life (Fig. 2). Local changes to the abiotic environment are widely documented in natural, cultural and recently modified landscapes throughout the world, including the dehesas (Joffre et al., 1999), African savannas (Dean et al., 1999), and Australian rangelands (Facelli and Brock, 2000). Typical changes involve a cooler and often wetter microclimate under a given tree due to the interception of radiation and precipitation (Mistry, 2000). Stem flow, water uptake through the root system from below and around the tree, and increased infiltration of water into the soil further enhance the concentration of water near a given tree, especially in otherwise dry environments (Vetaas, 1992; Eldridge and Freudenberger, 2005).

Scattered trees also contribute to a local increase of nutrients, as demonstrated in dehesas (Joffre and Rambal, 1993), in south-eastern Australia (Wilson, 2002), the Brazilian Caatinga (Tiessen et al., 2003), and African savannas (Belsky, 1994). Nutrient levels under scattered trees are typically enhanced by litter accumulation, animal dung, the interception of nutrients by trees, and the accumulation of nutrients by tree roots (Wilson, 2002; Dean et al., 1999; Prober et al., 2002). Many scattered trees in dry savannas form symbiotic relationships with *Rhizobium* bacteria, thereby fixing atmospheric nitrogen and making it accessible to plants (Vetaas, 1992). By increasing the local water balance and nutrient concentration, scattered trees can enhance primary productivity (Ludwig et al., 1999).

Numerous benefits to plant life originate from scattered trees. The most basic benefit to plant diversity is the presence of scattered trees themselves. In recently modified ecosystems, scattered trees often represent samples of the original, pre-modification vegetation, and therefore provide important conservation opportunities in their own right (see Section 3.2). In central American modified landscapes, scattered trees are often represented by more than 50 species (Guevara et al., 1992; Harvey and Haber, 1999; Otero-Arnaiz et al., 1999; Aguilar and Condit, 2001), and in temperate Australia many scattered trees are the remnants of threatened vegetation communities like white box-yellow box-Blakely's red gum woodlands (*Eucalyptus albens/E. melliodora/E. blakelyi*; Gibbons and Boak, 2002). The conservation values of scattered trees per se also has been noted in the Brazilian Cerrados (Furley, 1999), the dehesas (Díaz et al., 1997), and British wood-pastures (Peterken, 1981, 1996; Kirby et al., 1995). Some scattered tree systems, such as dehesas, can have relatively few tree species (*Quercus ilex* and *Q. suber*), but still have high conservation value (Díaz et al., 1997).

Many other plant species typically benefit from the presence of scattered trees. For example, dehesas provide habitat for 30% of vascular plants in the Iberian peninsula (Pineda and Montalvo, 1995). Both in natural savanna landscapes (San José et al., 1991) and human-modified landscapes like in Central America (Guevara et al., 1992) or eastern Australia (Toh et al., 1999), scattered trees often function as "nurse plants" or "fertility islands", in that they provide favorable conditions for the recruitment of other plants (San José et al., 1991; Facelli and Brock, 2000). Plant species richness is typically higher under scattered trees than in the surrounding landscape, as demonstrated in Central America (Guevara et al., 1992), the Negev desert in Israel (Munzbergova and Ward, 2002), arid Australia (Facelli and Brock, 2000), and temperate Australia (Prober et al., 1998).

Scattered trees also are used by a wide range of animals throughout the world, in natural, cultural and recently modified scattered tree ecosystems. The micro-ecosystem surrounding an individual tree greatly enhances structural complexity relative to its surrounds. A wide variety of birds has been documented as using the canopies of scattered trees, for example, in Australia (Law et al., 2000; Fischer and Lindenmayer, 2002a), Central America (Guevara and Laborde, 1993; Harvey and Haber, 1999; Luck and Daily, 2003), southern Africa (Dean et al., 1999), and central Africa (Duncan and Chapman, 1999). Insectivorous bats in Australia forage around the canopy of scattered trees (Law et al., 1999, 2000; Lumsden et al., 2002; Lumsden and Bennett, 2005), and frugivorous bats make extensive use of scattered trees in many tropical landscapes (Duncan and Chapman, 1999; Galindo-González et al., 2000; Galindo-González and Sosa, 2003). A wide variety of canopy invertebrates has been recorded in Australia (Majer and Recher, 2000), and a range of ground-dwelling invertebrates have been documented below scattered trees within the dry, semi-deciduous forest zone in Ghana (Dunn, 2000) and under paddock trees in south-eastern Australia (Oliver et al., 2006). Cavities in scattered trees are used by a variety of birds,

mammals, reptiles and amphibians, as documented in Australia (Saunders et al., 1982; Gibbons and Lindenmayer, 2002; Manning et al., 2004a) and southern Africa (Dean et al., 1999).

3.2. *Scattered trees as biological legacies*

In landscapes that have been disturbed by natural processes or human activities, scattered trees play an important role as "biological legacies" (Elmqvist et al., 2002). Biological legacies are organisms or organically derived structures that persist after a disturbance (Franklin et al., 2000). Biological legacies have several functions including: representation of tree species per se (see above); assisting other species to persist (the so-called "life-boating" function, sensu Franklin et al., 1997); providing habitat for recolonization of a site (structural enrichment); influencing patterns of ecosystem recovery (nucleation); providing a source of energy and nutrients for other organisms; and stabilization of environmental conditions (reviewed by Lindenmayer and Franklin, 2002).

The concept of "nucleation" is used to describe the spreading of recovery from many different foci following a disturbance (Franklin and MacMahon, 2000), and is a particularly important function of scattered trees. In recently disturbed ecosystems, scattered trees can act as "regeneration nuclei" (Guevara et al., 1986). This can be in the form of seed directly from the trees (Cascante et al., 2002; Elmqvist et al., 2002), or indirectly from seeds deposited in droppings by organisms attracted to the trees, such as birds and bats (Guevara et al., 1986; Elmqvist et al., 2002). Scattered trees can therefore function as focal points for future restoration activities (Otero-Arnaiz et al., 1999; see below). Despite reduced genetic variability, the reproductive potential of scattered trees remains high in some landscapes (Cascante et al., 2002), and scattered trees represent potential sources for large-scale natural regeneration of Australian woodlands (Dorrough and Moxham, 2005) and Central American rainforests (Galindo-González et al., 2000). Natural regeneration is a substantially cheaper and ecologically preferable form of restoration than tree planting (McIntyre, 2002; Spooner et al., 2002). The "fertility island" effect of scattered trees (see above) further enhances their ability to act as central points of ecosystem recovery from which plant succession may radiate outwards into other parts of a given landscape (Toh et al., 1999).

Scattered trees are often the oldest living structures in disturbed landscapes and provide important ecological continuity through time. Ironically, although scattered tree ecosystems, such as wood-pastures, are often not regarded as "proper forest" (Rackham, 1998), they can provide refuges for organisms associated with original "natural" forest. For example, wood-pastures in Britain contain structures, species, and communities which are relicts of past management systems as well as original natural forest (Peterken, 1981, 1996; Kirby et al., 1995). Trees in British wood-pastures can live between 300 and 500 years and provide habitat for fungi and invertebrates associated with decaying wood and epiphytes largely absent in other forest types (Peterken, 1981, 1996; Alexander, 1999). Similarly, retained trees in recently logged boreal forests provide habitat continuity for lichen species that are directly dependent on these trees (Hazell and Gustafsson, 1999). Furthermore, in many human-modified ecosystems, scattered trees pre-date the era of tree planting and preserve local tree genotypes (Kirby et al., 1995).

3.3. *Landscape-scale ecological functions of scattered trees*

In addition to the local-scale ecological functions of a given individual scattered tree, in combination, multiple trees scattered throughout a landscape provide additional ecological functions (Fig. 2). The most obvious landscape-scale function of scattered trees is that they contribute to the overall amount of tree cover in a landscape. The density of trees is of considerable scientific and conservation interest in natural landscapes (Jeltsch et al., 1996; Mistry, 2000). Perhaps more importantly, scattered trees make an important contribution to overall tree cover in many cultural and recently modified landscapes. Recently modified ecosystems such as grazing landscapes in temperate Australia (Gibbons and Boak, 2002) and tropical Central America (Galindo-González et al., 2000) often contain a large proportion of their total remnant tree cover as scattered trees or small clumps of trees.

Tree cover is important for many animal species, and low amounts of tree cover in previously forested landscapes may lead to cascades of extinctions as a result of the simultaneous loss of the amount of unmodified vegetation and landscape connectivity (Andrén, 1994). Despite its modified status, a landscape mosaic characterized by scattered trees often provides habitat for a range of animal species, including birds and bats in both Central America (Guevara and Laborde, 1993; Galindo-González and Sosa, 2003) and south-eastern Australia (Law et al., 2000; Fischer and Lindenmayer, 2002a,b). A key feature of landscapes with scattered trees is that their connectivity remains relatively high for some animals (Guevara and Laborde, 1993; Graham, 2001; Fischer and Lindenmayer, 2002b).

Landscapes dominated by scattered trees can provide valuable foraging habitat for some animal species. For example, lichen forest in the forest-tundra transition zone of the boreal forest in Quebec may represent a large reservoir of forage for large caribou (*Rangifer tarandus*) herds (L. Sirois, pers comm.). Some species of bats and birds that use scattered trees for foraging are important seed dispersers. In tropical modified landscapes, frugivorous bats play a particularly important role in dispersing primary and secondary rainforest plants (Duncan and Chapman, 1999), thus increasing plant genetic connectivity and population viability (Cascante et al., 2002). The survival of bats in these landscapes therefore is considered key to future forest recovery (Galindo-González et al., 2000). Other mutualists of trees, such as pollinators, have been studied less extensively in modified landscapes (but see Ricketts et al., 2004). However, the general notion that a loss of landscape connectivity may result in the disruption of mutualist relationships in fragmented landscapes is well established (Cordeiro and Howe, 2003), and it is reasonable to expect that scattered trees will at least somewhat improve connectivity for a wide range of mutualist species.

More generally, scattered trees enhance landscape heterogeneity (the horizontal patchiness) of landscapes. For modified landscapes, it is widely accepted that other things being equal, increased landscape heterogeneity tends to increase landscape scale species richness (Benton et al., 2003; Luck and Daily, 2003).

In previously densely vegetated landscapes, scattered trees contribute to the "softening" of the matrix surrounding more discrete vegetation remnants (Lindenmayer and Franklin, 2002). Structural contrast at edges is widely acknowledged to result in a cascade of abiotic and biotic changes, ultimately leading to synergistic changes in both plant and animal life (Ries et al., 2004; Harper et al., 2005). Scattered trees reduce the structural contrast between patch edges and the matrix, and therefore reduce the likelihood and intensity of negative edge effects.

4. Threats to scattered trees

Scattered trees in natural, cultural and recently modified landscapes face some similar threats, as well as some threats that are unique to particular ecosystems. The most direct threat to all scattered trees is clearing by humans. For example, the legal and illegal removal of scattered trees is widespread in Australian grazing landscapes (Gibbons and Boak, 2002). Similarly, widespread land clearing continues in some Central American landscapes (Aguilar and Condit, 2001).

A slower, but equally problematic, threat to scattered trees is the lack of natural regeneration. Recruitment failure is often related to high grazing pressure, and may be a problem in natural, cultural and recently modified landscapes with scattered trees. Reduced recruitment of scattered trees has been reported in African savannas (N. Van Rooyen, unpublished data, cited in Jeltsch et al., 1996), Central American farming landscapes (Harvey and Haber, 1999; Graham, 2001), dehesas (Pulido et al., 2001), British wood-pastures (Kirby et al., 1995), and temperate Australian grazing areas (Spooner et al., 2002; Saunders et al., 2003). In the latter, the lack of recruitment threatens the persistence of scattered trees across vast areas of the wheat-sheep zones in eastern and Western Australia. In these landscapes, scattered trees without any younger generations of trees are "the living dead" (sensu Janzen, 1988). Because many scattered trees are dying of old age, a recent study in eastern Australia estimated a narrow window of opportunity spanning only a few decades in which large-scale tree regeneration will be possible (Dorrough and Moxham, 2005).

Some scattered tree ecosystems can be threatened by vegetation encroachment. For example, in many natural dry savannas, overgrazing can lead to shrub encroachment with often detrimental consequences for native species (Meik et al., 2002). In dry savannas, the negative impacts of livestock grazing are often exacerbated by changed fire regimes and strong rainfall events, leading to the invasion of thickets of unpalatable shrubs (Milton et al., 1994; Tews et al., 2004b). Maintaining appropriate grazing pressure is also important in British wood-pastures to sustain trees and open grassy areas in the same location (Kirby et al., 1995). In wood-pastures, both too much and too little grazing can be a threat. If there is too much grazing, trees do not regenerate; if there is too little grazing, open wood-pastures turn into denser forest ecosystems (Peterken, 1981, 1996).

These examples highlight that although the effect of grazing can vary, appropriate grazing regimes are pivotal to the continued existence of many ecosystems characterised by scattered trees. Determining what constitutes an appropriate grazing regime is not straightforward, and depends on the particular ecosystem under investigation. In many cases, choices need to be made about which species are in most urgent need of conservation attention. For example, Martín and Lopez (2002) found that lizard abundance in dehesas increased with dense understory vegetation. However, dense understory vegetation decreased the quality of hunting habitat for the endangered Spanish imperial eagle (*Aquila adalberti*).

Salinity can be an additional threat to scattered trees in both natural and human-dominated dry ecosystems. Scattered trees contribute to maintaining the ground water table at naturally low levels (Stirzaker et al., 2002). The removal of scattered trees, in turn, can lead to a rising ground water table, which can bring naturally occurring salts to the surface. The widespread removal of trees in temperate Australia has led to large-scale salinity problems, which now threaten both biodiversity and agricultural productivity (Saunders and Hobbs, 1995). Similar mechanisms also have led to increased salinity in some natural ecosystems such as the Negev desert in Israel (Munzbergova and Ward, 2002).

More generally, scattered trees may be threatened by poor tree health. In the Mediterranean, the tree root pathogen *Phytophthora cinnamomi* is causing a severe decline of oak species (*Quercus* spp.) (Plieninger et al., 2003). In Australia, rural dieback of eucalypts, where trees are severely defoliated, is leading to large-scale and premature tree death (Landsberg and Wylie, 1983). It is caused by complex interactions between numerous biotic and abiotic factors, including land management practices (Landsberg, 1990). In the United Kingdom, debarking by the introduced grey squirrel (*Sciurus carolinensis*) threatens the long-term persistence of wood-pastures (Mountford and Peterken, 2003).

Finally, land use intensification poses a threat to scattered tree ecosystems. In the Iberian dehesas, regeneration failure of oak has been exacerbated by recent agricultural intensification (Díaz et al., 1997; Pulido et al., 2001) and urban development (Plieninger et al., 2004). In Australia, scattered trees are more likely to be lost in cropping landscapes than in grazing landscapes (Ozolins et al., 2001). In addition, removal of fallen deadwood and standing dead trees for firewood (Driscoll et al., 2000) and the "tidying" of pastures by farmers (Reid, in litt.) can threaten the continued existence of key structural elements. Similar threats have been reported in British wood-pastures. Here, the removal of fallen deadwood and standing dead timber has eliminated mature habitat in many places, and recreation pressures such as car parks, heavy trampling and removal of dangerous branches at iconic locations, and vandalism are important threats to the long-term persistence of wood-pastures (Kirby et al., 1995; Peterken, 1996).

5. Scattered trees and landscape management

5.1. *Landscape management approaches*

One of the great challenges in landscape management is the trade-off between meeting short-term human needs and

maintaining the capacity to provide ecosystem services in the long term (Foley et al., 2005). There is a growing debate about the best way to manage landscapes in the face of growing human populations and associated demand for food. This debate has recently been framed as a trade-off between two approaches: "land sparing" versus integrated landscape management (Green et al., 2005; Mattison and Norris, 2005). Land sparing occurs where higher yielding parts of the landscape are intensively farmed to reduce pressure for more farmland. Integrated landscape management (also known as wildlife-friendly farming, sensu Green et al., 2005) is where native species are maintained across entire production landscapes (Green et al., 2005).

While land sparing may be attractive in theory (Green et al., 2005), it may be unsustainable in practice. First, there is no guarantee that land sparing will reduce forest loss because greater farm productivity can induce additional clearance to further increase profitability (Simon and Garagorry, 2005). Second, there is no guaranteed link between intensification in one place and reservation in another. Third, high productivity areas are most likely to be targeted for intensification, but are usually already the least reserved and most modified (Braithwaite et al., 1993; Lindenmayer and Franklin, 2002). Furthermore, the density of many organisms is skewed towards the most productive parts of landscapes (Braithwaite, 1983). Fourth, land sparing can result in the separation of commodity production and non-production areas, which ignores the interdependence of the two and the interaction of pattern and process in landscapes. Fifth, the consequences for long-term sustainability from land sparing are unknown because of potential lag effects on organisms and ecosystem processes arising from landscape consolidation. Sixth, land use intensification often eliminates key landscape elements, such as scattered trees, that obstruct machinery and intensive farming practices (Maron, 2005).

As a consequence of these issues, it may be difficult to differentiate the practical on-ground outcomes of land sparing from the traditional transition of land use, seen throughout human history, towards greater intensification and ecosystem fragmentation (sensu Saunders et al., 1991; McIntyre and Hobbs, 1999; Foley et al., 2005). As discussed above, land use intensification is a major threat to scattered tree ecosystems around the world. Evaluation of land sparing and consolidation of native ecosystems as land management options should first consider their possible shortcomings, and their potential effects on keystone structures such as scattered trees.

5.2. *Scattered trees and integrated landscape management*

Integrated landscape management attempts to reconcile conservation and production in the same landscape (sensu Hobbs and Saunders, 1991), and is practiced in many cultural scattered tree ecosystems, such as the dehesas or British wood-pastures. In integrated landscapes formerly covered by forest or woodland, scattered trees can be used as a useful landscape management tool which can complement conservation reserves and consolidated blocks of remnant vegetation.

Agroforestry, which is defined as "an intimate mixture of trees with farm crops and/or animals on the same piece of land" (Savill et al., 1997, p. 234), is a good example of how scattered trees can be used as a landscape management tool. Agroforestry has significant potential to achieve conservation goals in agricultural landscapes (Harvey et al., 2004; Salt et al., 2004) and lies at the intersection between agriculture and forestry. Both dehesas and wood-pastures are examples of agroforestry.

Some techniques from forestry also offer useful insights on the benefits of integrating scattered trees in landscapes over the long term. The notion of biological legacies (see above) underpins the technique of "green tree retention" which is increasingly being used in boreal forest management (Vanha-Majamaa and Jalonen, 2001). With green tree retention, a certain number of trees are retained permanently after harvesting to mimic conditions after a moderate-intensity natural disturbance (Vanha-Majamaa and Jalonen, 2001; Lindenmayer and McCarthy, 2002). The main purposes of green tree retention are:

- the "life-boating" of species and processes after logging as tree cover is re-established;
- the enrichment of re-established stands with structural elements; and
- the enhancement of landscape connectivity (Franklin et al., 1997).

Green tree retention can maintain canopy continuity, preserve old and large trees and maintain habitat and structural diversity. There are two spatial patterns of green tree retention. First, in "dispersed retention" retained structures are distributed evenly throughout the harvest unit. This form of retention is also useful for dispersing mitigating effects (such as modification of microclimate, hydrology or soil stabilization through roots) over the whole stand (Franklin et al., 1997; Lindenmayer and Franklin, 2002). Second, in "aggregated retention" small patches are retained to be representative of the original stand conditions and to provide intact understory and soil organic layers. Unlike dispersed retention, effects of this approach are confined to the immediate area around the retained patch (Franklin et al., 1997; Lindenmayer and Franklin, 2002). Green tree retention thus contributes to a continuum of possible forest management options, and represents one end which explicitly recognizes the value of scattered trees.

The principles underpinning agroforestry and green tree retention have implications for the management of existing scattered tree ecosystems and formerly wooded and forested landscapes. Variable retention harvest systems (which include green tree retention as a component) provide "a continuum of structural retention options" (Franklin et al., 1997, p. 115). The idea of a continuum of landscape management options, from consolidated patches through to areas of scattered trees offers a promising approach to landscape management. As a practical approach to managing landscapes, this would be highly compatible with recent developments in the area of landscape concepts. Scattered trees do not fit well into schematic "patch-matrix-corridor" landscape models which categorize landscapes either "habitat" or "non-habitat" (McIntyre and Hobbs, 1999; Manning et al., 2004b). This is

because they occur in what is generally considered the "matrix". It is now recognized that many landscapes have habitat that is modified, but not destroyed ("landscape variegation" sensu McIntyre and Hobbs, 1999). It is also recognized that vegetation often occurs in spatial continua and habitat boundaries are often indistinct or gradual (McIntyre and Hobbs, 1999; Manning et al., 2004b). Further, different organisms perceive and respond to the same landscape differently (the Continua- *Umwelt* concept, Manning et al., 2004b). This paper demonstrates that many organisms consider scattered trees as important habitat. The maintenance and expansion of scattered trees across landscapes, and the use of techniques such as agroforestry and green tree retention, are highly compatible with these continua-based landscape concepts. It is thus possible to envisage future landscapes where consolidated conservation areas will be embedded within integrated, multi-use scattered tree ecosystems.

In grazing landscapes, such as those in temperate Australia, regeneration of scattered trees could be encouraged through techniques such as micro-restoration. The aim of micro-restoration is to facilitate the regeneration of saplings in the immediate vicinity (<30 m radius) of existing large scattered trees thereby maintaining the spatial pattern of scattered trees (Lindenmayer et al., 2005; Fig. 3). Methods for micro-restoration will be locally specific, and dependent on the specific mechanisms involved in the regeneration of particular tree species. However, methods might include encouragement of regeneration by placing small temporary fences around individual mature trees or groups of trees to exclude grazing, direct planting and seeding, soil scarifying or burning beneath existing trees. Notably, micro-restoration could be useful in complementing existing restoration programs which aim to establish large and consolidated patches of native vegetation (Bennett et al., 2000). Other management strategies might include reduced stocking rates or alternative grazing regimes (Jansen and Robertson, 2001; Spooner et al., 2002).

Future landscape management approaches, using a range of tree retention and regeneration techniques, would ideally recognize the complementary contributions of large patches of native vegetation and extensive areas of scattered trees, and provide a promising vision for genuine and sustainable integration of conservation and production.

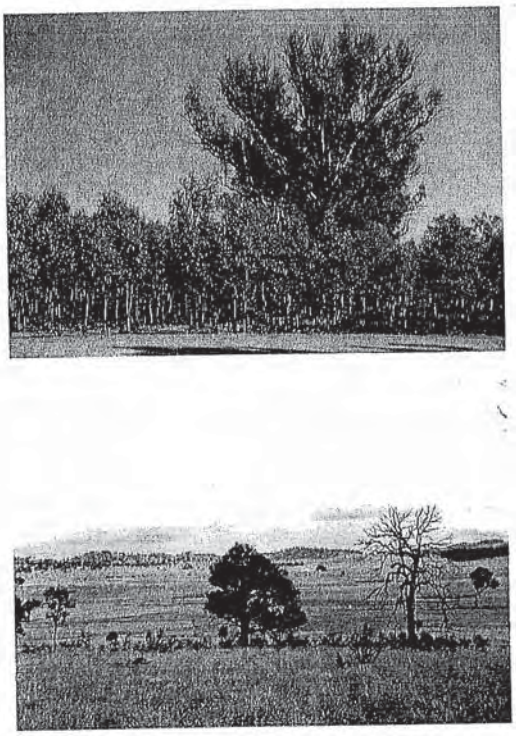

Fig. 3 – Micro-restoration is where tree regeneration is facilitated in the immediate vicinity (<30 m radius) of an existing scattered tree. These examples, from south-eastern Australia, show what micro-restoration might look like (top photo by D. Lindenmayer, bottom photo by A. Manning).

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Letter
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Oaks 2040: The Status and Future of Oaks in California

By Tom Gaman and Jeffrey Firman[1]

Introduction: Developing planning tools for oak futures in California

Ecological functions, wildlife habitat, recreational opportunities and scenic values are seriously impaired as population densities and other landscape use pressures increase. Managers of oak woodlands and forests need to balance the biological, sociological and economic interests of private landowners, public agencies, business, universities, environmental groups and concerned individuals. Planning must address the complexities of local, regional and state-wide oak issues within the context of practical on-the-ground land use decisions.

Oaks 2040 is based on objective oak data and is designed to serve decision makers who may develop local and regional Oak Woodlands Management Plans or advance other conservation strategies. A statewide map of oak distribution and a current forest and woodland inventory, created by state and federal researchers, were the starting points for Oaks 2040. From those, regional analyses of forest structure and oak types as well as region-specific oak inventory summaries have been developed. By evaluating these maps and inventories against current economic growth projections, Oaks 2040 identifies the location and extent of oaks most at risk.

Cover photo: Black Oak at Big Sur

[1] Tom Gaman tgaman@fforestdata.com and Jeffrey Firman jfirman@fforestdata.com of Forest Data, P.O. Box 276, Inverness, CA 94937. Gaman and Firman (see www.forestdata.com) have been active many years in forest inventory, data analysis, mapping and forest conservation. Both have master's degrees in forestry from Yale University. Gaman is a registered professional forester and a board member of the California Oak Foundation.

Citizens Concerned with Oak Conservation:

Oaks are more than a distinct component of the landscape for many of us who live in California. For hundreds of years, people have lived in, raised families under, and worked around these generous, natural and cultural icons. Today, increasing population pressures and poorly-planned development are threatening oak sustainability.

The Oak Woodland Conservation Act requires cities and counties to assess their wealth in oak resources and to adopt Oak Woodlands Management Plans in order to meet the need for healthy watersheds, clean air and water, and sufficient high quality wildlife habitat. These Plans must include a description of native oak species and their current and historical distribution, as well as existing threats, status of natural regeneration and urban growth trends. These Plans must also recognize the economic value of oak woodlands in their respective jurisdictions and encourage and support farming, ranching and grazing operations compatible with oak woodland conservation.

Oaks 2040 is designed to provide various stakeholders involved with developing or updating their community's Oak Woodlands Management Plan with current information on 48 of the 58 counties that contain significant oak resources. Every effort has been made to present this important information fairly.

Readers must realize, however, that COF is an advocate for sustainable oak resources. To that end, the full report mentions the importance of using available tools, such as acquisition in fee, conservation easements in perpetuity, deed restrictions and oak mitigation banks, in a timely fashion to achieve conservation of oak resources.

COF's Board of Directors thanks its members, associates and friends for their individual and collective efforts to establish a viable Oak Reserve system made up of well-managed oak woodlands and forests on private and public lands throughout California.

Sincerely,
Janet Santos Cobb

Methods

MAPPING OAK TYPES

A number of overall vegetation maps, maps of hardwoods in general, and oak-specific maps have been generated over the years. Currently, the most reliable statewide vegetation map available is the "LCMMP Vegetation Map" (FRAP map) produced by the California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) in conjunction with the US Forest Service (USFS) Region 5 Remote Sensing Lab (RSL) in Sacramento. While these maps do not focus specifically on oaks, oak habitat types can easily be extracted from these vegetation types. Using these maps as a foundation (supplemented by other earlier mapping efforts), species-specific range maps of oak types throughout the state (FRAP 2005) have been generated.

The FRAP map uses the *Calveg* classification system which first divides all vegetation into *Covertype*. Covertype can be equal to the following: conifer (CON), shrub (SHB), barren (BAR), hardwood (HDW), grass (HEB), water (WAT), conifer/hardwood mix (MIX), urban (URB), or agricultural (AGR). For finding oak habitat, only two *Covertypes* are relevant. All *woodland* classified as 'hardwood' (HDW) or *forest* classified as 'conifer/hardwood mix' (MIX) can potentially be oak habitat provided it contains the relevant hardwood species. All other *Covertypes* were eliminated from the analysis.

"The Oak Woodland Conservation Act requires cities and counties to assess their wealth in oak resources and to adopt Oak Woodlands Management Plans in order to meet the need for healthy watersheds, clean air and water, and sufficient high quality wildlife habitat."

After *Covertype*, the Calveg system also specifies *Vegtype*, which identifies the dominant species association. For both HDW and MIX covertypes, the data were screened to ensure that the hardwood associations being mapped in a particular location are oaks. Dozens of hardwood *Vegtypes* are mapped throughout the state, but only twelve are dominated by tree oaks. Nine of these are dominated by a single species, each forming its own Oak Habitat Type, or "Oak Type." Three heterogeneous hardwood types were combined to generate a "mixed" Oak Type. The ten resulting Oak Types, each potentially occurring in both "woodlands" and "forests"[2], are listed in the following Table 1:

This rigorous selection and reclassification process was applied to the FRAP maps. The results are GIS layers and maps depicting the distribution of woodland and forest oak habitat types throughout California. These geographic data provide the foundation for the landscape-level analysis of the distribution and diversity of California's oak woodlands and oak forests. See the tables in Appendix A for acres of cover where oaks dominate the woodland by county and Oak Type and acres of cover where oaks are present in the forest by county and Oak Type.

OAK TYPE	SCIENTIFIC NAME	TYPE(S)
Black Oak	*Quercus kelloggii*	QK
Blue Oak	*Quercus douglasii*	QD
Canyon Live Oak	*Quercus chrysolepis*	QC
Coast Live Oak	*Quercus agrifolia*	QA
Engelmann Oak	*Quercus engelmannii*	QN
Interior Live Oak	*Quercus wislizeni*	QW
Oregon White Oak	*Quercus garryana*	QG
Tanbark Oak	*Lithocarpus densiflorus*	QT
Valley Oak	*Quercus lobata*	QL
Mixed Oaks	not applicable	EX/NX/TX

Table 1. Oak Types

[2] "Oak Woodlands" are considered to be those mapped vegetation types where oaks dominate the landscape. By definition, they have at least 10% canopy cover. "Oak Forests" are those vegetation types dominated by trees, but *Quercus spp.* or *Lithocarpus densiflorus* may not necessarily be among the dominant species.

OWNERSHIP AND AT RISK ANALYSIS

Two additional layers are added to further intensify the oak mapping analysis. Land ownership and development risk layers are incorporated into the map to assess pertinent conservation issues. The land ownership data is courtesy of the California Department of Forestry's Forest and Rangeland Resources Assessment Program (FRAP 1999). Using the FRAP layer, the state is divided into a variety of public and private ownership categories. The statewide ownership layer overlaid on top of the Oak Type map reveals ownership patterns of California's oaks.

The development risk data has been derived from the California Department of Finance's projected development layer. This dataset is based on 2000 US Census Data (FRAP 2001). This layer tracks past development by decade and predicts future development through 2040. Using this information, three categories were defined. 'Developed' is defined as anything that has been developed (greater than 32 housing units per square mile) by 2000. 'At Risk' refers to anything that has not been developed by 2000 but is expected to develop by 2040. 'Stable' refers to anything that has not been developed by 2000 and is unlikely to be developed before 2040.[3] Once the layer was divided into these three categories, it was overlaid on top of the Oak Type Map. The oak woodlands of the state were thereby divided into groups by oak type, ownership and development risk.

INVENTORY AND ANALYSIS

The other critical element for assessment of mapped oak types is the inventory summary, which is based upon data obtained from the USFS Forest Inventory and Analysis Program (FIA). This statewide grid of permanent forest survey sample "plots" yields information about what the mapped oak forests and woodlands look like on the ground. The plots provide information not obtainable via remote sensing techniques – an inventory of forest fuels, species distribution, specific size, growth, regeneration, habitat features, pest and disease. With point-specific data ranging from species composition to seedling regeneration to tree size and density, these plots help one understand the makeup of each of the ten oak types.

The most recent FIA field data was obtained to provide an inventory of each of the oak types discussed above. Combining the ground-based survey data and the GIS mapping data enabled the authors to provide a comprehensive oak inventory using new vegetation maps and the 2001-2004 FIA inventory data.

Using conventional computer programs, inventory data was processed to produce summaries of each plot. The survey plots were grouped by oak type within each region and a customized program was used to produce inventory summaries per acre by oak type by region. Regional totals were then summed up to provide an inventory for the entire state. A variety of other factors were analyzed using the inventory data including basal area and tree counts per acre of oaks relative to total trees, size distribution, regeneration status, and determination of associated hardwood and conifer species. Appendix B summarizes these details for woodlands and forests statewide by oak type.

[3] The 'developed' and 'at risk' designations are assigned to privately owned lands only, as those held in public ownership are considered 'stable' with regard to development. However, publicly-owned lands do face other challenges such as poor oak regeneration and non-sustainable land management practices.

California oaks: the statewide analysis

To facilitate statewide analysis, California counties have been grouped into six distinct regions, each of which is discussed later in this report. In an attempt to represent the levels at which conservation policy is often decided, county boundaries have been utilized for this regional split (see Figure 1), rather than natural boundaries such as watersheds or bioregions.[4] The tables in Appendix B summarize inventory details for woodlands and forests statewide by oak type.

"The plots provide information not obtainable via remote sensing techniques – an inventory of forest fuels, species distribution, specific size, growth, regeneration, habitat features, pest and disease."

Figure 1 – California is divided into six regional groupings of counties.

[4] These are the same regions used in Bolsinger's 1988 *The Hardwoods of California's Timberlands, Woodlands, and Savannas*, except that the San Joaquin Valley has been separated from the rest of Southern California.

OAKS PLAY A MAJOR ROLE IN THE CALIFORNIA LANDSCAPE

California has approximately 8.5 million acres of oak woodland and 4.5 million acres of oak forest. These 13 million acres comprise more than one-eighth of the state's area (see Figure 2). The Sacramento and San Joaquin regions are home to more than half of California's oak woodland. Oak forests are concentrated in the North Coast and North Interior regions. California currently has approximately two billion oaks greater than 1" DBH. More than 800 million of these oaks are larger than 5" DBH.

California oaks are diverse. Blue oak is California's dominant oak species, representing more than one-third of the state's oak woodlands. Canyon, coast and interior live oak woodlands comprise approximately one-third of California's oak woodlands. Tanbark, black and canyon live oak forests account for more than 80 percent of California's oak forests.

In oak woodland, oaks comprise 60 percent of the total tree basal area, 67 percent of trees greater than 5" DBH and 37 percent of trees greater than 24" DBH. In oak forest, oaks comprise 18 percent of the total tree basal area, less than 24 percent of trees greater than 5" DBH and eight percent of trees greater than 24" DBH. Blue oak, Oregon white oak and, to a lesser extent, interior live oak, are regenerating poorly. Blue oak averages about one seedling per thousand square feet in woodlands, and less than one seedling (one foot or more in height) per two established oak trees. Not a single Engelmann oak or valley oak seedling was tallied on any of the 932 FIA plots.

OAKS 2040: FUTURE PROSPECTS FOR CALIFORNIA'S OAKS

More than one million acres of California's oak woodlands are developed and approximately 750,000 are at risk of development before 2040. Twenty percent of California's oak woodlands are facing rapid and increasing urbanization by 2040. The oak woodlands of the Central Valley and Sierra Foothills face the most immediate threats. Eighty percent of California's oak woodlands that are at risk of development are located in the Sacramento and San Joaquin regions. See Figure 3.

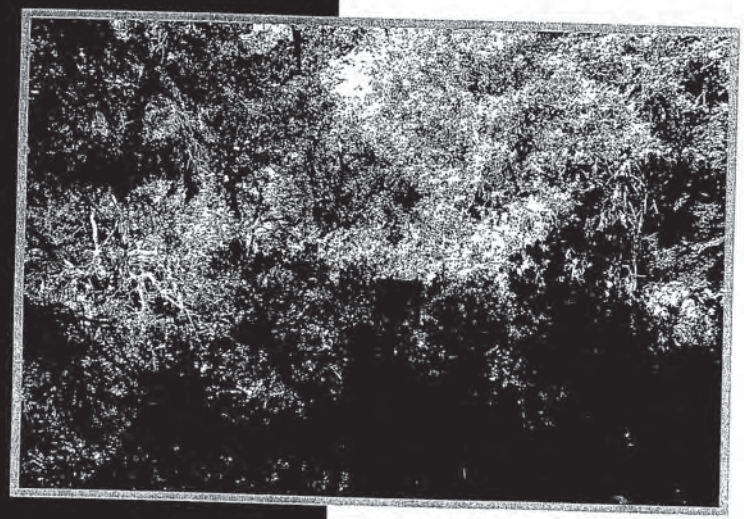
"More than one million acres of California's oak woodlands are developed and approximately 750,000 are at risk of development before 2040."

Figure 2 – This map shows the distribution of oak woodlands and oak forests.

Figure 3 – This map illustrates the distribution of California's oaks 'developed,' 'at risk' and 'stable.'

North Coast Region

Del Norte
Humboldt
Mendocino
Sonoma



Oaks 2040 co-author Tom Gaman is pictured in a mixed forest of Oregon white oak, interior live oak and canyon live oak.

California Oaks: The Regional Analyses

This section provides regional summaries. Each regional description includes oak distribution, oak woodland, oak forest diversity and oaks at risk.[1]

[1]Appendix B summaries herein presented statewide are further detailed by region in the full report online at http://www.californiaoaks.org/Oaks2040.

North Coast Region

Counties included in this region are Del Norte, Humboldt, Mendocino and Sonoma.

OAK DISTRIBUTION

The North Coast Region has 1.3 million acres of oak woodland and 1.5 million acres of oak forest. In fact 35 percent of California's oak forest is found in the North Coast region, and oaks are present on 45 percent of the region's land (more coverage than any other region).

Mendocino County contains more than one-half of the region's oak woodland, but Humboldt and Sonoma counties also have significant stands. The North Coast's oak forests are found primarily within Humboldt and Mendocino counties.

In the North Coast region, there are 210 million oaks greater than 1" DBH and 110 million oaks greater than 5" DBH. Only the Central Coast tops the North Coast's two million oaks with DBH greater than 24".

NORTH COAST OAK DIVERSITY

The North Coast oak woodlands feature Oregon white oak, tanbark oak and mixed oak. Canyon live oaks and black oaks are also present, mixing in with Douglas-fir, madrone and bay. Oaks comprise approximately one-half of the basal area, trees/acre, and trees greater than 5" DBH/acre in white oak woodlands. In tanbark oak woodlands, *Quercus spp.* (true oaks) comprise less than 20 percent of the basal area, trees/acre, and trees greater than 5" DBH/acre, but when including tanbark oak *(Lithocarpus densiflorus)* oaks then comprise 48 percent of basal area and number of trees per acre.

In the North Coast's oak forests, tanbark oak is predominant. Associated species include Douglas-fir, redwood, madrone, bay, canyon live oak and black oak. In tanbark oak forests, oaks provide 42 percent of the basal area and more than half of total trees greater than 1" DBH.

OAKS AT RISK IN THE NORTH COAST REGION

In terms of ownership, 84 percent of the North Coast's oak woodlands are located on private property. Most of the remainder is owned by the USFS and various other federal government agencies. Private ownership of oak woodland increases moving southward, ranging from 40 percent in Del Norte County to 95 percent in Sonoma County. Eight percent of North Coast oak woodlands have already been developed and four percent are at risk of near-time development. Nearly 90 percent of the oak woodlands are reasonably stable for the time being.

Sonoma County has experienced the most urbanization with 20 percent of oak woodlands developed and 10 percent at risk. Oak woodland development rates are relatively low in Del Norte and Humboldt counties with more than 95 percent of oak woodlands being stable for now. Mendocino County oak woodland is already five percent developed and another five percent is at risk of development before 2040.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

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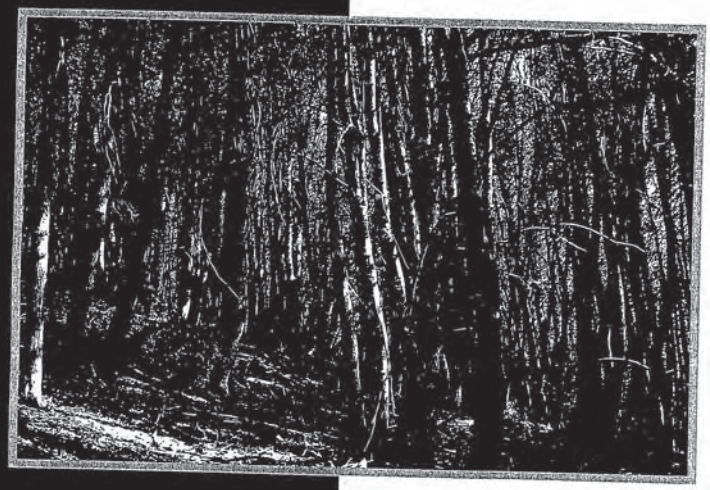
North Interior Region

Lassen
Modoc
Shasta
Siskiyou
Trinity



Tanbark oak forest

North Interior Region

Counties in this region are Lassen, Modoc, Shasta, Siskiyou and Trinity.

OAK DISTRIBUTION

Nearly one million acres of oak woodland and 1.1 million acres of oak forest reside within the North Interior. The North Interior and the North Coast are the only two regions with more oak forest than oak woodland. With over 550,000 acres of oak woodland, Shasta County contains more than half of the region's totals. Trinity and Siskiyou Counties also contain large areas of oaks, with nearly 800,000 acres of oak forest and more than 400,000 acres of oak woodland in total. The North Interior has nearly 400 million oak trees, and 150 million of these oaks are greater than 5" DBH.

NORTH INTERIOR REGION OAK DIVERSITY

In this region, a balanced mixture of blue oak, black oak, canyon live oak and Oregon white oak woodlands is found. Blue oak woodlands typically include gray pine and either interior or coast live oak, and oaks comprise more than 80 percent of the basal area and more than 90 percent of the trees. Oregon white oak woodlands include black oak, Douglas-fir, and ponderosa pine, and oaks make up 40 percent of the basal area and more than half of the trees greater than 5" DBH. In black oak and canyon live oak woodlands, oaks comprise 50 percent of the basal area and 70 percent of the trees greater than 5" DBH.

In the North Interior oak forests, canyon live oak and black oak are prominent. These two oak species mix in with the local conifer species, including Douglas-fir, ponderosa pine, sugar pine and madrone. In black oak forests, oaks comprise one-fifth of the basal area. One-third of the trees greater than 5" DBH are oaks. In canyon live oak forests, one-third of the tree basal area is oaks and less than half of the trees greater than 5" DBH are oaks.

OAKS AT RISK IN THE NORTH INTERIOR REGION

In terms of ownership, 60 percent of North Interior oak woodlands are privately owned. The USFS manages 33 percent and the Bureau of Land Management (BLM) manages six percent. Excluding Shasta County, oak woodland ownership is split roughly 50-50 between private and public; the USFS manages most of the public oak woodland. Shasta County's oak woodland ownership is 73 percent private, 20 percent USFS, and six percent BLM.

Ten percent of the region's oak woodland has already been developed. Three percent is at risk for development by 2040. Eighty-seven percent is unlikely to develop before 2040. Shasta County oak woodland is most at risk with fifteen percent having been developed and five percent more to be developed by 2040. Oak woodlands in Trinity, Siskiyou, Modoc and Lassen Counties are all less than five percent developed and less than one percent at risk.

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Central Coast Region

Alameda
Contra Costa
Marin
Monterey
San Benito
San Francisco
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Solano
Ventura

Coast live oak savannah in Marin County

Central Coast Region

Counties included in this region are Alameda, Contra Costa, Marin, Monterey, San Benito, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano and Ventura.

OAK DISTRIBUTION

The Central Coast is home to 1.6 million acres of oak woodlands and 300,000 acres of oak forests. Oaks are present on 17.5 percent of the region's area.

Four counties provide 75 percent of the Central Coast oak woodlands: Monterey, Santa Barbara, Santa Clara and San Luis Obispo. Oak woodlands comprise more than 20 percent of the area in Alameda, Monterey and Santa Clara counties. Santa Cruz County has more than 100,000 acres of forest oaks, and there are oaks present on over 50 percent of county land.

CENTRAL COAST OAK DIVERSITY

One-half of the Central Coast's oak woodland is coast live oak, and one-third is blue oak. Eighty percent of California's coast live oak woodland is in the Central Coast. Coast live oak woodland regularly includes bay trees, but oaks account for nearly 80 percent of the basal area in this oak type and over 90 percent of the trees greater than 10" in diameter. Blue oak woodland often includes coast live oaks.

Overall, more than 95 percent of trees in all size classes are oaks. Mixed oak woodlands include coast live oak and bay mixing with black and/or blue oaks. Oaks account for more than 60 percent of the basal area and more than 50 percent of the trees greater than 5" DBH in these stands. Thirty percent of the state's valley oak woodland is in the Central Coast, but there is not adequate inventory data to confidently describe this critical oak type.

Tanbark oak and coast live oak account for three-quarters of the region's oak forests. Redwood and Douglas-fir are dominant in tanbark oak forests, but oaks comprise 40 percent of the trees greater than 5" DBH and one-quarter of the basal area. Coast live oak forests often include canyon and/or interior live oak, with bay and redwood or Douglas-fir. Overall, oaks account for 10 percent of the basal area of oak forest stands and provide more than 20 percent of the trees greater than 5" DBH.

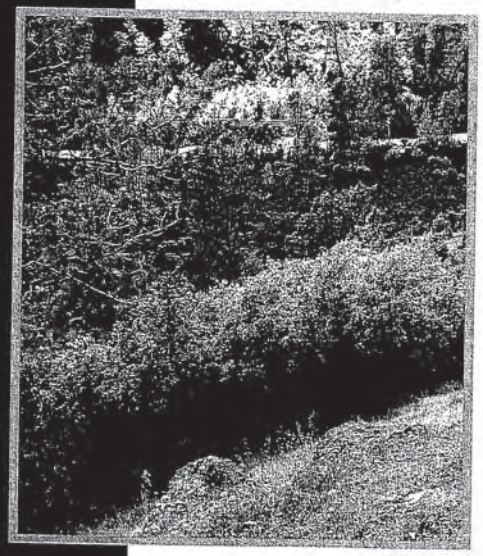
OAKS AT RISK IN THE CENTRAL COAST REGION

A complex land ownership matrix covers the oak woodlands of the Central Coast. Private ownership of oak woodlands predominates, averaging 75 percent throughout the region and ranging from 65 percent in Santa Barbara County to 95 percent in Alameda County. Another 15 percent is managed by the Los Padres National Forest, five percent by the US Military, and five percent by state and local governments. The Los Padres National Forest covers much of the oak woodlands in Ventura, Santa Barbara, San Luis Obispo and Monterey counties. Additionally, the BLM manages 20 percent of San Benito's oak woodlands and Fort Hunter-Liggett holds 12 percent of Monterey's oak woodlands. The state owns approximately 10 percent of oak woodland in Santa Clara, Contra Costa and Santa Cruz counties. Local ownership covers nearly 20 percent of oak woodland in Marin and Contra Costa counties.

Almost 85 percent of the Central Coast oak woodlands are unlikely to be developed before 2040. Most of the remaining areas have already been developed. Less than three percent is still at risk of development. Monterey County once again leads the way with 24,000 acres of oak woodland at risk, more than half of the region's total. Santa Clara, Santa Barbara, and San Luis Obispo counties are next on the list. Four percent of Monterey's oak woodlands are at risk, topped in the region only by Santa Cruz County at eight percent. In fact, more than three-quarters of Santa Cruz's oak woodlands have already been developed and less than 16 percent are currently in the stable category. Both of these figures are records for the state.

Sacramento Region

Butte
Colusa
El Dorado
Glenn
Lake
Napa
Nevada
Placer
Plumas
Sacramento
Sierra
Solano
Sutter
Tehama
Yolo
Yuba



Mixed oak woodland dominated by gray pine

Sacramento Region

Counties in this region include Butte, Colusa, El Dorado, Glenn, Lake, Napa, Nevada, Placer, Plumas, Sacramento, Sierra, Solano, Sutter, Tehama, Yolo and Yuba.

OAK DISTRIBUTION

The Sacramento region's 2.1 million acres of oak woodlands provide nearly one-quarter of the state's total. Oaks are present on 20 percent of the region's land.

Tehama County has more oak woodlands than any other county in the region, but large oak populations are found in many counties. Thirty-three percent of Napa County is covered by oak woodlands, giving it the greatest density of oak woodlands in the state. Tehama, Yuba, Lake and Nevada counties are each at least 20 percent covered by oak woodlands.

SACRAMENTO REGION OAK DIVERSITY

More than half of the Sacramento region's oak woodlands are blue oak. Gray pines mix in, but oaks comprise 70 percent of the basal area and 80 percent of the trees greater than 5" DBH. The region contains more than one-third of the state's blue oak woodland.

Interior live oak woodland contains blue oak, valley oak, black oak, gray pine, and ponderosa pine. Canyon live oak and black oak woodlands include Douglas-fir, ponderosa pine, and incense cedar. In canyon and interior live oak woodland, oaks make up 80 percent of the basal area and 90 percent of the trees.

The Sacramento region has more than one-third of California's valley oak woodland. Tehama County has the most blue oak, valley oak and canyon live oak woodland. El Dorado has the most interior live oak and black oak woodland.

Black oak and canyon live oak dominate the region's oak forests. Canyon live oak forests are 60 percent oaks, mixing with ponderosa pines and Douglas-firs. Black oak forests are 25 percent oaks, along with Douglas-fir, ponderosa pine, white fir and incense cedar.

OAKS AT RISK IN THE SACRAMENTO REGION

More than 80 percent of the Sacramento region's oak woodland is privately owned. The USFS owns about 60 percent of the remaining public lands, including large portions of the oak woodlands in Plumas (81 percent), Sierra (74 percent), Glenn (28 percent), Placer (20 percent) and Lake (19 percent) counties.

Private ownership of oak woodlands surpasses 80 percent in all other counties, topped off by Solano (98 percent), Yolo (97 percent), Sacramento (96 percent), Colusa (94 percent), and Napa (93 percent) counties.

The Sacramento region is more at risk of development than any other. Only two-thirds of its oak woodlands are considered 'stable.' One-sixth is developed and one-sixth is at risk. More than 300,000 acres of oak woodland could be developed in the Sacramento region by 2040.

El Dorado County has more oak woodlands at risk than any other county in the state, but Tehama, Butte and Yuba counties are not far behind. By 2040, 80 percent of El Dorado's oak woodlands and more than half of the oak woodlands in Nevada, Yuba and Placer counties may be developed.

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San Joaquin Region

Alpine
Amador
Calaveras
Fresno
Inyo
Kern
Kings
Madera
Mariposa
Merced
Mono
San Joaquin
Stanislaus
Tulare
Tuolumne

Valley oaks in Calaveras County

San Joaquin Region

Counties in this region are Alpine, Amador, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare and Tuolumne.

OAK DISTRIBUTION

The San Joaquin region has more than 2.3 million acres of oak woodlands and 500,000 acres of oak forests. Oaks are present on only 10 percent of the region's land. However, certain portions of the region have far greater oak woodland density than others. Twenty-seven percent of the state's oak woodlands fall within these 15 counties. The San Joaquin region currently has more than 450 million oak trees. More than one-third of these oaks are larger than 5" DBH.

SAN JOAQUIN REGION OAK DIVERSITY

More than half of the region's oak woodlands are blue oak and another 25 percent are interior live oak. Associated species include gray pine and buckeye, as well as valley oak, blue oak and canyon and interior live oaks. The San Joaquin region has more blue oak woodlands and interior live oak woodlands than any other region. In blue oak woodlands, oaks account for 70 percent of the trees and 80 percent of the basal area and trees greater than 5" DBH. In interior live oak woodlands, oaks provide 70 percent of the tree basal area and more than 80 percent of all trees. In canyon live oak woodlands, oaks comprise 55 percent of the basal area, 62 percent of all trees and 67 percent of trees greater than 5" DBH.

Canyon live oak and black oak comprise almost 90 percent of oak forests. Associated species in San Joaquin oak forests include incense cedar, ponderosa pine, sugar pine and white fir. In canyon live oak forests, oaks provide one-third of the basal area and nearly one-half of the trees. In black oak forest, oaks comprise more than half of the trees, but only one-third of the trees greater than 5" DBH and only one-quarter of the tree basal area.

OAKS AT RISK IN THE SAN JOAQUIN REGION

Seventy-three percent of the San Joaquin region's oak woodlands are privately owned. The USFS owns 18 percent and BLM owns five percent. Ten percent of the oak woodlands in the region have already been developed. Ten percent are at high risk of development by 2040. Eighty percent are currently stable, however targeted planning could ensure that a greater number of acres are conserved for the long-term. Nearly 250,000 acres of oak woodlands in the San Joaquin region are at risk of development by 2040. Only the Sacramento region contains more oak woodlands at risk. In Madera, Amador and Calaveras counties combined, more than one-third of all oak woodland may be developed before 2040.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach B

Southern Region

Imperial
Los Angeles
Orange
Riverside
San Bernardino
San Diego

Blue oak woodland in Machesna Mountain Wilderness, Los Padres National Forest

Southern Region

Counties in this region are Imperial, Los Angeles, Orange, Riverside, San Bernardino and San Diego.

OAK DISTRIBUTION

The Southern region is home to more than 300,000 acres of oak woodlands and more than 200,000 acres of oak forests. Combined, these 500,000 acres comprise only two percent of the region. However, discounting urban areas and desert, oak woodland concentration is much higher. San Diego and Los Angeles counties collectively contain more than two-thirds of the Southern region's oak woodlands. San Bernardino County has the greatest area (90,000 acres) of oak forests in the region.

SOUTHERN REGION OAK DIVERSITY

Coast live oak and canyon live oak are most prevalent, but black oak and Engelmann oak populations are also significant. Eighty-five percent of the basal area is comprised of oaks. Ninety-two percent of the trees greater than 5" DBH are oaks and 96 percent of the trees greater than 1" DBH are oaks. The rare Engelmann oak is found only within this region, mostly in San Diego County. Los Angeles County is home to the majority of the region's blue oak and valley oak woodlands.

Canyon live oak and black oak dominate in the Southern region's oak forests. These oaks mix with Coulter pine, Jeffrey pine, incense cedar and white fir.

Oaks comprise less than 50 percent of the basal area but more than 80 percent of the trees and 65 percent of the trees greater than 5" DBH.

OAKS AT RISK IN THE SOUTHERN REGION

The oak woodlands of the Southern region have the highest levels of public ownership found in the state. USFS owns 44 percent of the region's oak woodlands. Eleven percent of oak woodlands are owned by other government agencies, and 45 percent are privately owned. The land ownership patterns within this region are variable. The oak woodlands in San Diego and Orange counties are predominantly privately-owned, but the USFS owns most of the oak woodlands in San Bernardino, Riverside and Los Angeles counties.

Twenty percent of the Southern region's oak woodlands have already been developed. Ten percent are at risk of development by 2040. Development of the remaining 70 percent is not anticipated in the near future. Oak woodland development percentages are higher than in any other region in the state. Only the Sacramento region has a lower percentage of oak woodlands that are considered stable.

Riverside and San Diego counties lead the region with almost 20 percent of their oak woodlands at risk. Both Orange and Los Angeles counties have already had over 20 percent of their oak woodlands developed.

San Diego and Orange counties have the lowest percentages of stable oak woodland with 65 percent in each county. San Bernardino tops the list with 78 percent stable for the time being.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach B

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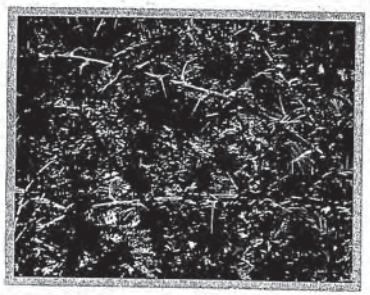

Post-fire black oak regeneration in Mendocino National Forest

APPENDIX A – TABLE ONE: ACRES OF COVER WHERE OAKS DOMINATE THE WOODLAND BY COUNTY AND OAK TYPE

REGION	COUNTY	OAK TYPE									
		Black Oak	*Blue Oak*	*Canyon Live Oak*	*Coast Live Oak*	*Engelmann Oak*	*Interior Live Oak*	*Mixed Oak*	*Oregon White Oak*	*Tan Oak*	*Valley Oak*	*Total Acres*
North Coast	Del Norte	84	0	1,011	0	0	0	2,939	355	42,778	0	47,168
	Humboldt	16,671	0	20,831	10	0	0	13,572	100,484	153,873	0	305,442
	Mendocino	49,553	12,040	60,603	863	0	16,715	119,231	283,036	104,631	4,206	650,879
	Sonoma	3,212	524	7,354	21,601	0	1,484	176,852	41,124	30,402	524	283,077
North Interior	Lassen	7,965	0	0	0	0	0	0	438	0	0	8,403
	Modoc	737	0	0	0	0	0	0	369	0	0	1,106
	Shasta	170,028	268,857	83,918	0	0	4,643	46	21,116	336	6,055	554,998
	Siskiyou	13,053	0	57,570	0	0	0	10,141	97,529	5,646	0	183,938
	Trinity	51,154	275	84,077	0	0	0	0	80,692	15,747	11	231,956
Central Coast	Alameda	0	29,273	12	40,340	0	0	28,255	0	0	1,396	99,275
	Contra Costa	30	29,758	50	32,564	0	2,462	5,051	0	0	691	70,605
	Marin	0	310	0	10,383	0	0	36,792	875	0	108	48,468
	Monterey	679	252,092	0	266,145	0	0	12	0	26,776	6,641	552,345
	San Benito	0	61,729	0	44	0	0	753	0	0	8	62,534
	San Luis Obispo	1,773	68,413	92	83,636	0	0	25,419	0	31	8,672	188,035
	San Mateo	0	515	0	15,021	0	0	3,089	0	65	1,403	20,093
	Santa Barbara	0	22,548	26,794	170,970	0	0	0	0	197	2,925	223,435
	Santa Clara	52	58,083	110	74,259	0	0	58,888	0	10	3,543	194,946
	Santa Cruz	0	0	0	22,474	0	0	6,362	0	48	0	28,884
	Ventura	61	151	14,427	49,929	0	0	0	0	0	1,179	65,747
Sacramento	Butte	20,042	100,835	31,037	0	0	46,668	4,045	0	5,031	429	208,084
	Colusa	353	112,868	3,342	0	0	167	0	450	0	1,563	118,741
	El Dorado	35,900	46,247	24,591	0	0	90,549	15,893	0	0	3,708	216,888
	Glenn	5,842	83,184	23,385	0	0	23	0	2,755	0	2,626	117,816
	Lake	23,948	90,203	34,348	42	0	3,508	15,013	7,777	1,091	2,126	178,056
	Napa	1,236	62,243	941	5,719	0	6,682	88,715	1,380	12	1,474	168,400
	Nevada	27,129	34,650	12,328	0	0	49,647	2,686	0	84	2,172	128,697
	Placer	35,541	49,754	41,854	0	0	24,333	12,212	0	0	2,709	166,403
	Plumas	18,543	0	11,730	0	0	0	38	0	102	0	30,413
	Sacramento	0	7,254	0	0	0	789	26	0	0	49	8,119
	Sierra	9,200	8	8,512	0	0	8	3	0	79	0	17,809
	Solano	44	17,365	0	2,010	0	848	6,228	0	0	1,074	27,568
	Tehama	24,505	443,003	46,383	0	0	1,973	0	1,069	71	12,238	529,242
	Yolo	0	78,912	61	9	0	1,313	0	0	0	1,155	81,450
	Yuba	10,459	47,733	4,150	0	0	26,186	527	0	1,685	1,384	92,122
San Joaquin	Alpine	612	0	130	0	0	0	0	0	0	0	742
	Amador	9,360	49,802	12,071	0	0	44,813	5,912	0	0	1,631	123,588
	Calaveras	11,729	112,449	26,552	0	0	42,538	860	0	0	235	194,362
	Fresno	15,929	228,915	41,437	0	0	81,779	22,354	0	0	424	390,838
	Inyo	590	0	3,546	0	0	0	25	0	0	0	4,161
	Kern	16,732	153,891	49,437	10	0	73,062	22,822	0	0	7,059	323,013
	Kings	0	9,576	0	0	0	343	111	0	0	0	10,029
	Madera	9,407	124,132	29,844	0	0	98,561	1,896	0	0	2,320	266,160
	Mariposa	12,317	120,825	42,628	0	0	106,607	684	0	0	798	283,858
	Merced	0	50,868	0	2,411	0	5	3,973	0	0	532	57,790
	San Joaquin	0	17,484	0	424	0	437	1,686	0	0	18	20,049
	Stanislaus	0	104,218	0	1,288	0	1,279	1,074	0	0	181	108,038
	Tulare	43,406	157,740	43,210	0	0	67,799	33,504	0	0	256	345,915
	Tuolumne	18,082	72,807	48,071	0	0	72,308	349	0	0	186	211,803
Southern	Los Angeles	1,596	2,487	60,102	30,790	32	351	970	0	0	2,177	98,503
	Orange	0	0	2,419	10,440	0	0	0	0	0	0	12,859
	Riverside	3,248	0	14,207	12,128	2,371	910	172	0	0	0	33,036
	San Bernardino	11,083	0	33,953	2,534	0	538	761	0	0	0	48,869
	San Diego	10,623	0	9,255	74,491	17,964	54	8,515	0	0	0	120,903
	ALL COUNTIES	692,507	3,184,018	1,016,373	930,534	20,367	869,380	738,455	639,449	388,695	85,882	8,565,659

APPENDIX A – TABLE TWO: ACRES OF COVER WHERE OAKS ARE PRESENT IN THE FOREST BY COUNTY AND OAK TYPE

REGION	COUNTY	OAK TYPE										
		Black Oak	*Blue Oak*	*Canyon Live Oak*	*Coast Live Oak*	*Engelmann Oak*	*Interior Live Oak*	*Mixed Oak*	*Oregon White Oak*	*Tan Oak*	*Valley Oak*	*Total Acres*
North Coast	Del Norte	1,344	0	1,611	0	0	0	8,762	948	130,743	0	143,408
	Humboldt	18,556	0	32,777	0	0	0	42,345	43,757	519,090	0	656,524
	Mendocino	39,223	544	33,603	484	0	2,100	39,060	69,662	395,741	0	580,416
	Sonoma	675	0	2,618	3,849	0	29	47,157	7,767	68,488	0	130,583
North Interior	Lassen	2,446	0	0	0	0	0	0	0	0	0	2,446
	Shasta	231,378	5,066	48,675	0	0	93	24	13,894	468	0	299,597
	Siskiyou	32,313	0	180,891	0	0	0	73,999	99,747	85,800	0	472,749
	Trinity	76,489	0	130,061	0	0	0	0	49,701	61,739	0	317,989
Central Coast	Alameda	0	0	0	432	0	0	413	0	0	0	844
	Contra Costa	4	286	98	1,042	0	294	236	0	0	0	1,959
	Marin	0	0	0	118	0	0	15,125	0	2,429	0	17,672
	Monterey	0	229	0	24,421	0	0	6	0	26,414	0	51,069
	San Benito	0	50	0	0	0	0	0	0	0	0	50
	San Luis Obispo	1,542	44	0	1,162	0	0	1,775	0	0	0	4,522
	San Mateo	0	0	0	8,113	0	0	2,347	0	46,577	121	57,158
	Santa Barbara	0	0	13,708	4,813	0	0	0	0	0	0	18,521
	Santa Clara	193	36	0	5,080	0	0	4,271	0	5,911	0	15,491
	Santa Cruz	0	0	0	58,378	0	0	7,473	0	50,895	0	116,746
	Ventura	0	0	27,705	801	0	0	0	0	0	0	28,505
Sacramento	Butte	50,365	3,010	28,510	0	0	4,718	9,460	0	41,470	0	137,533
	Colusa	2,088	193	6,071	0	0	0	0	2,551	0	0	10,904
	El Dorado	59,220	157	16,225	0	0	4,155	7,829	0	100	64	87,750
	Glenn	5,522	75	3,954	0	0	0	0	2,483	0	0	12,033
	Lake	17,725	503	18,082	0	0	214	5,601	5,169	284	33	47,612
	Napa	410	68	512	31	0	0	17,396	159	10	0	18,587
	Nevada	75,680	724	18,602	0	0	4,133	407	0	1,328	67	100,941
	Placer	69,336	146	22,150	0	0	752	8,569	0	0	72	101,025
	Plumas	43,057	0	10,980	0	0	0	146	0	237	0	54,420
	Sierra	29,495	0	12,706	0	0	0	84	0	427	0	42,713
	Solano	0	0	0	0	0	6	0	0	0	0	6
	Tehama	32,200	1,004	16,577	0	0	172	0	2,152	61	0	52,166
	Yuba	24,450	86	5,272	0	0	1,725	648	0	17,245	156	49,582
San Joaquin	Alpine	250	0	90	0	0	0	0	0	0	0	340
	Amador	15,502	0	7,446	0	0	3,115	1,644	0	0	47	27,754
	Calaveras	22,842	0	35,566	0	0	13,537	850	0	0	0	72,795
	Fresno	38,798	2,212	37,285	0	0	1,166	65	0	0	0	79,526
	Inyo	173	0	8,147	0	0	0	0	0	0	0	8,320
	Kern	23,428	818	37,609	0	0	572	947	0	0	53	63,427
	Kings	0	213	0	0	0	0	0	0	0	0	213
	Madera	24,728	37	23,870	0	0	5,249	23	0	0	320	54,227
	Mariposa	35,742	34	26,151	0	0	11,900	44	0	0	92	73,964
	Tulare	37,483	9	14,208	0	0	326	631	0	0	0	52,656
	Tuolumne	37,778	83	41,705	0	0	14,112	31	0	0	25	93,736
Southern	Los Angeles	2,863	306	42,577	464	0	14	60	0	0	0	46,283
	Orange	0	0	919	14	0	0	0	0	0	0	933
	Riverside	2,948	0	32,346	183	0	252	0	0	0	0	35,728
	San Bernardino	46,395	0	35,057	32	0	130	151	0	0	0	81,764
	San Diego	16,302	0	8,390	6,490	0	0	8,654	0	0	0	39,836
	ALL COUNTIES	1,118,940	15,933	982,753	115,906	0	68,762	306,234	297,989	1,455,456	1,050	4,363,023

(FIA) PLOTS IN CALIFORNIA OAK WOODLANDS AND FORESTS 2001-2004

OAK WOODLAND

Oak Type	ACRES	# FIA PLOTS	TOTAL BASAL AREA SQ FT /ACRE	OAK BASAL AREA SQ FT /ACRE	NON-OAK REGENERATION SEEDLINGS /AC	OAK REGENERATION SEEDLINGS /AC	# TOTAL TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE 1-5" DBH	# OAK TREES /ACRE 5-10" DBH	# OAK TREES /ACRE 10-16" DBH	# OAK TREES /ACRE 16-24" DBH	# OAK TREES /ACRE 24-32" DBH	# OAK TREES /ACRE >32" DBH
Black Oak	692507	35	91	39	272	454	382	223	135	72	14	1	0	0
Blue Oak	3184018	244	23	19	31	49	101	81	49	22	7	2	0	0
Canyon Live Oak	1016373	76	77	53	129	190	307	239	128	89	17	4	0	0
Coast Live Oak	930534	79	44	36	94	192	234	136	92	23	15	5	1	0
Engelmann Oak	20367	2	20	20	0	0	10	10	0	0	6	3	1	1
Interior Live Oak	869380	60	42	31	70	135	196	172	110	51	8	2	0	0
Mixed Oak	738455	74	59	37	240	138	154	70	25	22	16	6	1	0
Oregon White Oak	639449	40	68	34	223	144	189	121	73	31	14	3	1	0
Tanbark Oak	388695	20	148	68	615	300	610	292	161	95	30	4	1	0
Valley Oak	85882	4	28	20	0	0	67	44	19	18	6	0	1	1

OAK FOREST

Oak Type	ACRES	# FIA PLOTS	TOTAL BASAL AREA SQ FT /ACRE	OAK BASAL AREA SQ FT /ACRE	NON-OAK REGENERATION SEEDLINGS /AC	OAK REGENERATION SEEDLINGS /AC	# TOTAL TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE 1-5" DBH	# OAK TREES /ACRE 5-10" DBH	# OAK TREES /ACRE 10-16" DBH	# OAK TREES /ACRE 16-24" DBH	# OAK TREES /ACRE 24-32" DBH	# OAK TREES /ACRE >32" DBH
Black Oak	1118940	70	143	44	689	326	533	200	135	43	17	4	1	0
Blue Oak	15933	2	72	17	712	263	165	18	0	3	12	3	0	0
Canyon Live Oak	982753	65	117	43	344	404	397	196	125	52	15	4	1	0
Coast Live Oak	115906	7	204	39	129	96	334	137	64	57	10	4	1	0
Engelmann Oak	0	NO PLOTS IN THIS TYPE												
Interior Live Oak	68762	8	74	13	1312	347	123	28	9	11	6	1	0	0
Mixed Oak	306234	16	169	46	586	187	456	175	103	48	20	3	1	0
Oregon White Oak	297989	22	82	22	406	174	259	90	51	30	6	2	0	0
Tanbark Oak	1455456	108	173	63	919	293	497	266	169	69	19	8	1	0
Valley Oak	1050	NO PLOTS IN THIS TYPE												

Regional summaries are available at www.californiaoaks.org/Oaks2040.

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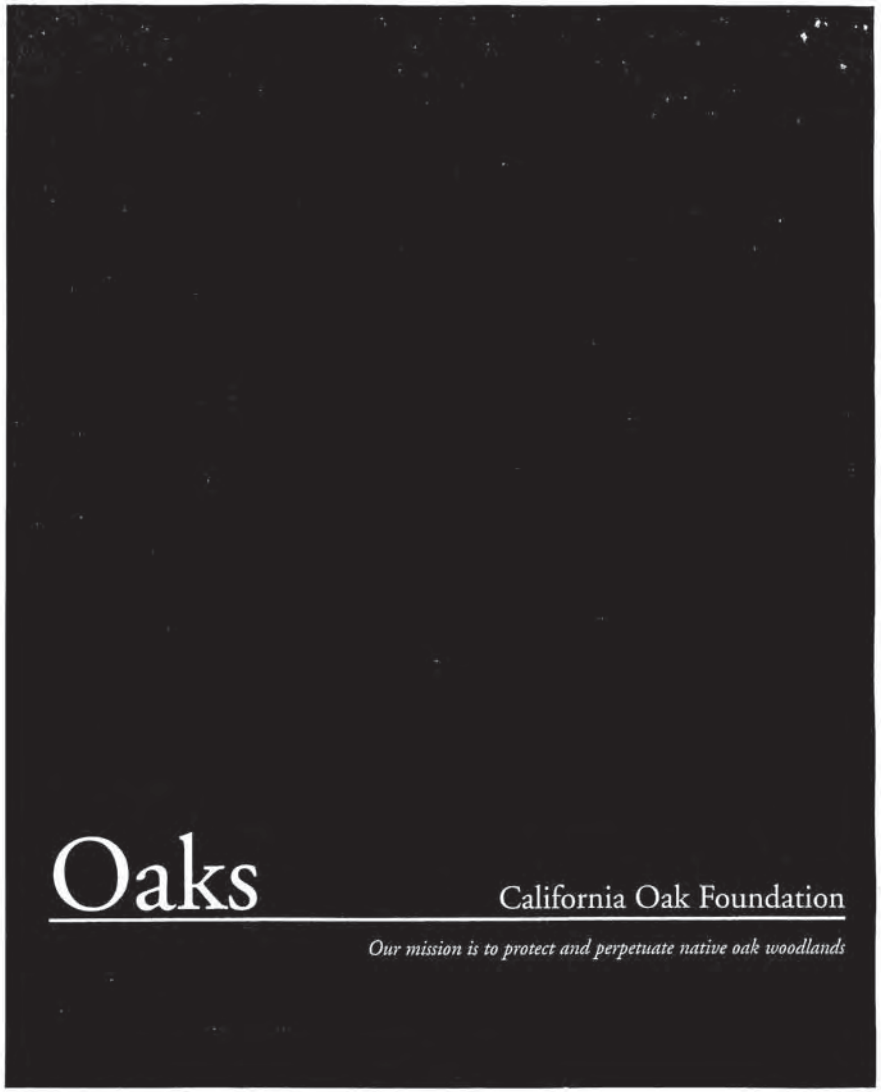
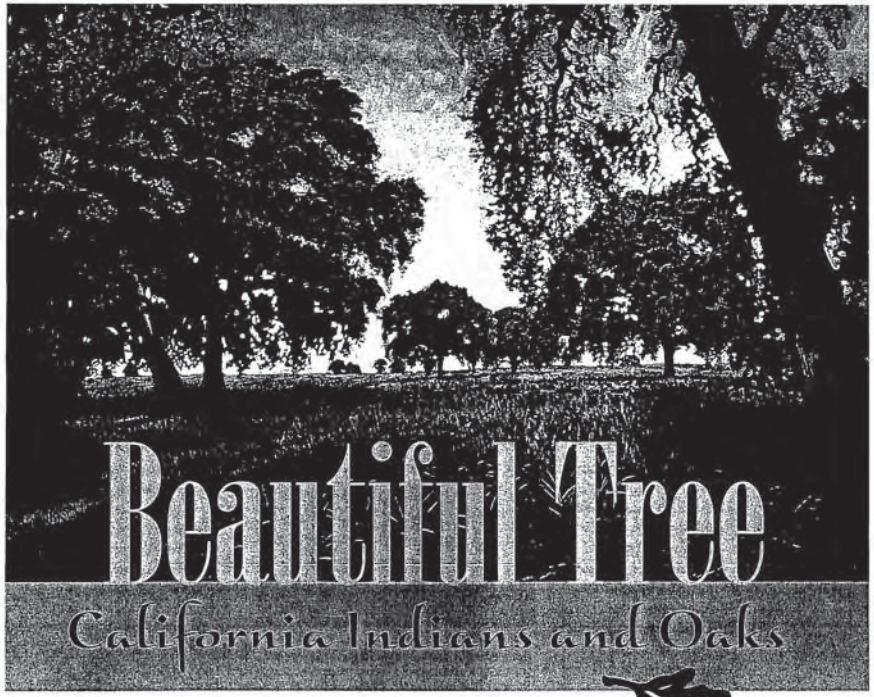




Beautiful Tree

California Indians and Oaks

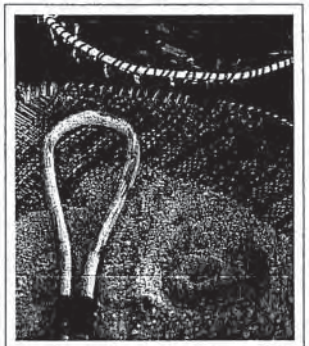
SARA-LARUS TOLLEY

When Europeans first stepped foot in the territory now called California, it was one of the most densely populated areas on the continent. The rich ecosystem was made up of a web of interrelated plants and animals, many of which relied on oaks or acorns to survive. Remnants of the great oak savannahs remain in some parts of the state, but urbanization, agriculture, and grazing have taken their toll. Yet, Native peoples of California still consider the acorn a symbol of the sustenance of their cultures, and today environmentalists frequently turn to the tribes to help build coalitions for the preservation of open space where oaks might spread their branches. One important connection that the tribes emphasize in such struggles is that protecting oaks means protecting sacred areas: village sites, pounding rocks, burial places. Here, respecting Native peoples and respecting oaks go hand in hand. This special supplement celebrates Indian peoples' relationships with oaks, oak-based ecological communities, and acorns. It highlights connection and looks to protection, in the spirit of something Makahmo Pomo basketweaver Elsie Allen once said: "The Indians and the acorn trees are just like the same thing. We wouldn't be the same Indians if there weren't acorns. Far as I know, the acorn trees have always been here and so have we."

In the Pomo language, the word for oak, chiskale, means "beautiful tree."

Kaweah Oaks, oil on canvas, 2004, by Laura Cunningham.

There are twenty species of oak in California and, ecologically speaking, sixty-eight oak communities. Oaks are absent from only the most extreme environments. This means great diversity on a common plan: valley oaks can grow up to 150 feet tall, while the huckleberry oak grows only three or four feet. Botanically, oaks (genus *Quercus*) are divided into three broad groups, apparently distinguished by bark coloring, but in fact distinguished by acorn production: there are white, black, and intermediate oaks. White oaks produce an acorn crop in one year; black oaks take two years. And while the meat of white oak acorns is white, sweet, and palatable, black oak acorns have higher fat content and are yellow in appearance and often bitter with tannins. "Intermediate" oaks are just that—intermediate between white and black. The black oaks are generally the favored species when it comes to harvesting acorns for food. Tan oaks are also favored, and perhaps even preferred. Botanically tan oaks belong to a separate genus and species *(Lithocarpus)* and are thus technically not oaks, but we include them in this supplement on the merit of their tasty acorns and the cultures they have sustained.



Acorn flour ground by Rose Enos (Washoe/Maidu) in a sifting basket by her mother, Lizzie Enos (Washoe/Maidu), at a demonstration at the Oakland Museum. Photo by Dugan Aguilar.

As with all things in nature, oaks have cycles of productivity. Some years are better for acorn than others and thus the diversity of oak species in a landscape is very important. In terms of human use, these cycles of good and bad years mean that the gathering and storage of acorns is a true skill. Along similar lines, tribal leaching technologies were real breakthroughs that made available a nutritional bounty from an otherwise unpalatable and indigestible plant form. As Pavlik et. al. explain, "Depending on the species, acorns can contain up to 18 percent fat, 6 percent protein, and 68 percent carbohydrate (the rest being water, minerals, and fiber). In comparison, modern varieties of corn and wheat have 2 percent fat, 10 percent protein, and 75 percent carbohydrates. Acorns are also good sources of vitamins A and C and many of the essential amino acids" (2002: 76). The contributors to this supplement celebrate the taste and styles of eating such an excellent food source.

California peoples' technological innovations and cultural patterns of using acorn led, in turn, to techniques for leaching buckeye, grinding pinole, and processing other plants. Again and again we'll find that oaks played their part in the bounty of the California landscape in more than the most obvious ways.

For instance, it is worth contemplating the mycorrhizal relationship between oak roots and fungi. Oaks gather water through fuzzy white root coverings called mycorrhizae and the sugars in these root coverings attract fungi that give the oak roots water and minerals. What this leads to

Native Californians and foresters often differ on their views of the tan oak. For Native Californians, the tan oak is a beautiful tree, a source of nourishment and delight; for foresters, it's a tree that usurps land from other trees, grows very quickly, and is generally seen as a scourge. Because of this difference, Native communities and foresters often disagree about which trees to protect and conserve.

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is the production of the delectable *Boletus edulis* (porcini), honey, and other mushrooms!

Further still, the large amount of protein and fat in acorns is more than enough to nourish a wide variety of animals. Mule deer browse extensively on acorns as well as on oak leaves and twigs. And it's not just deer: of California's 169 terrestrial mammals, at least 60 use oak communities and landscapes. Oaks support little mammals—harvest mice, dusky-footed woodrats—and big ones—mountain lions, black bears, even grizzlies back in the day. (Joaquin Miller and many others described young grizzlies dining delicately in tired oak branches, or adults pounding their weight against trees to get the fatty seeds to fall.)

Mary Birchfield (Yurok) blowing ash off a cooking stone that has been lifted from the fire with a cooking paddle. Sumeg Village dedication, Patrick's Point State Park, September 22, 1990. Photo by Beverly R. Ortiz.

Countless varieties of insects are attracted to these trees, too. Oaks host more gall insects than any other native tree in the United States. A gall develops as part of a chemical reaction that occurs when insect eggs (typically wasp eggs) hatch into larvae. These tumor-like growths will be used as food for the larvae so they can make it to their adult stage. Meanwhile, millions of migrating birds are dependent on these same insects that inhabit the oak corridors. (The term "corridor," by the way, might help you visualize the state's remaining oak communities as pathways for animals that, sadly, do not always connect without breaks.) In oak communities, one finds so many amazing creatures: Rare ants. Arboreal salamanders. Western skinks, with their glamorous blue tails, as you'll see represented in one of Bari Talley's illustrations in this supplement. Even common creatures become alluring when their biological story gets told: oaks support communities of acorn woodpeckers, who are cooperative breeders, sharing their granaries as they raise their young in extended families. So dependent are they on their oak environment, the cooperative system breaks down when there are shortages due to the destruction of the many varieties of oak they rely upon. Oaks, you see, are the keystone species in their environments. If they go, the whole interrelated web goes. The point here and throughout this supplement is that when we think of oaks, we should expand our sense of the bounty that they provide.

Again looking to humans and their relationships with these trees, besides the acorns and the animals attracted to the acorns, oaks provide wood for cooking and heating and material for decorative and everyday arts. Oaks also form the basis for creation myths and tribal identities: eating acorn has become a means of internalizing culture and constituting oneself (on a cellular level!) as a California Indian person. And teaching about oaks and acorn is a means of cultural education. Here, culture and conservation come together once again, because a traditional component of the California Indian world view is, in the most general sense, that the bounty of oaks needs to be used to be fully respected. Helen McCarthy has written sensitively about this topic.

> There is a strong interdependence between plants and people. The acorns—and other resources as well—were put here on earth for people to use, for people's survival. The people need the plants in order to live, but the plants also need the people; they need people to gather their seeds, and leaves, and roots, and to talk and sing and pray to them....If plants are not used by people the spiritual relationship is broken, and the plants no longer have a place (1993: 225).

This might offer a way of thinking about such recent scourges as Sudden Oak Death; in answer to the disease, Kashaya Pomo elders have been praying over the tan oaks. This practice of respectful use runs counter to non-Indian ecological perspectives that might put oaks in isolated preserves (like animals in zoos), surrounded by pavement or subdivisions, valued for their beauty alone. The dilemma of the modern world always seems to be a variation on the idea that without flooding, predators, burning, and gathering, the whole system doesn't work as well, but going back to "the way things were" is no longer completely possible. California Indians find themselves enmeshed in these kinds of conundrums and compromises. California's tribes, for instance, strive for a balance of use and protection of resources as they make political decisions about what is best for their communities today. In what follows, readers will find examples of the kinds of political and cultural use decisions tribes have made. What will become clear is that it is not at all hard to find a lifetime of lessons if one takes the time to consider the stories and meanings, histories and botanies, of California's beautiful oaks. ❧

References:

Pavlik, Bruce M., Pamela C. Muick, Sharon G. Johnson, and Marjorie Popper. *Oaks of California.* Los Olivos, CA: Cachuma Press, 2002.

McCarthy, Helen. "Managing Oaks and the Acorn Crop" in *Before the Wilderness: Environmental Management by Native Californians.* Menlo Park: Ballena Press, 1993.

The Heart of the First Oak

In the Maidu creation myth it is declared that the Creator's first act, after forming the dry land, was to cause a great oak tree to spring up, on which grew all the twelve varieties of acorns. Later these different varieties came to grow on different trees. The miraculous tree, however, created by Ko'doyanpe, was still standing, according to old men, at Durham (Ta'doiko) at the time when, in the early 1840s, the first settler arrived. The tree was cut down by him in spite of strong protest by the Indians; and it is declared that the stump bled profusely at the first stroke of the axe, and that in the heart of the tree was found a peculiar substance "like a roll of thin, strong paper," from which the blood flowed. The exact spot at which the tree stood is still pointed out. ❧

Roland B. Dixon. "The Northern Maidu." American Museum of Natural History Bulletin *(1905), 17 (3).*

Maidu Tree of Life, by Dalbert Castro. Photo courtesy of the Oakland Museum of California.

Acorns Were Not Always Bitter

According to Cahuilla oral literature, acorns were not always bitter. At one time, it is said, two powerful shamans had an argument. One of them caused all acorns to become bitter to harm the other shaman. Since that time it has been necessary for Cahuilla to leach their acorns. Another version of the story says that it was the creator-god Mukat who became angry at his people and turned acorns bitter.

Lowell John Bean and Katherine Siva Saubel. Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. *Malki Museum Press, Morongo Indian Reservation: 1979.*

Julia Parker (Coast Miwok/Kashaya Pomo) removing acorn from a leaching basin, Yosemite National Park, c. 1986. Photo by Beverly R. Ortiz.

Story of Oaks

The White Oak *(ahuwham)* had her cap all finished nicely. The Live Oak *(kan'put)* had her cap all finished too. Black Oak *(hansiip)* was making *ashiphanahitch* (a long water-packing basket), and when they said, "Let's go," she put her hat on. That's why it is long. Tanbark Oak was making an Indian basket cap *(ap'xan)* and hers wasn't finished, but she put it on, and that's why the tanbark acorns look so rough.

Ixhareya were the beings before they became trees and rocks.

White Oak and Live Oak laughed at Tanbark Oak and Black Oak, but they retorted, "As long as people live, they will always have us first, and you—they don't think much about you." And that is why, when people are together, they always make tanbark acorn soup and the next they use is black oak.

They laughed at Tanbark Oak because her cap looked so rough, and at Black Oak because her cap was so long.

Mary Ike. In Karuk Myths *by Alfred Kroeber and Edward Gifford. Berkeley: University of California Press, 1980.*

New Caps, by Bari Gayle Morehead Talley.

The Annual Harvest

INTERVIEWS BY SUELLEN OCEAN

Editor's note: In the fall of 2004, Suellen Ocean, author of Acorns and Eat 'Em *and* The Acorn Mouse, *interviewed Native Californians throughout the state about that year's acorn harvest. What follows are excerpts from her interviews with Ronald W. Lincoln, Sr., Julie Tumamait-Stenslie, and Patrick Renick.*

In the west, over the mountains, **Ronald W. Lincoln, Sr.**, was out gathering acorns when I first tried to reach him. Ronald lives on the Round Valley Reservation in Covelo, which is located in Mendocino County. His heritage is Wylackii, Konkow, and Pomo. Ron and members of his family are gathering the acorns this (and every) year from black oak and tan oak trees. The older family members are teaching the young ones. They talk as they gather.

When asked if the places where they gather are ancient, Ron's reply is that

> they are pretty much old, but a lot of the old trees have been cut down or a fire went through there. We are fortunate at Round Valley Indian Reservation; we have a lot of [gathering sites] and we develop relationships with the ranchers. Many will work with us, it's a yearly thing, and we're always looking for new places. The regular spots are sparse; we need new spots. Every other year we go to different sites, they're all mapped out.
>
> We keep up the tradition and share with other folks and barter. We like to have acorns available for gatherings and ceremonies. We make acorn mush and it's served by itself; why spoil it by adding anything to it? It's a natural food. Processed food now is killing everybody.
>
> The trees have a spirit about them; they are living things. That's what we honor. The acorns are a sacred food, and we handle them gently. We crack them and clean them up nice. We are respectful and process them with good thoughts in mind.
>
> We're modern, we use whatever is available, we dry them using cardboard or sacks that we can stick out into the air, or if it's raining we put them by the stove. We try to be quick about it. Acorns, they don't wait for anybody; if we don't gather them up the deer will get them.

Hot Springs Leaching

Hayes (1929:50) reported a variation on the customary leaching technique among the Cupeño at Warner's Hot Springs. He observed them soaking acorn and plum seed in the hot springs. Romero (1954:56) also recorded an alternate processing method in which acorns were put into fine, hand-woven net bags tied with rawhide and placed into a stream. According to Romero, the running water caused acorn shells to split open and released most of their tannic acid. They were then dried and ground into meal.

Lowell John Bean and Katherine Siva Saubel. Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. *Morongo Indian Reservation: Malki Museum Press, 1979.*

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a valley ripe with acorns
and yellow poppies everywhere
as I lay here
dreaming of you

William Oandasan. Round Valley Songs. *Minneapolis: West End Press, 1984.*

Julie Tumamait-Stenslie is a storyteller from the Chumash nation living "fourteen miles inland, in Ojai, in oak-studded Ventura County," where there are live and coast oak as well as smaller varieties, probably thirty different varieties of oak trees, she said. She has been working as an educator for about sixteen years and knows a lot about her people.

Julie grew up eating a lot of natural foods, but she only started working with acorn about ten years ago. At first she stored the acorns in plastic bags, but she quickly learned not to do this because in plastic bags the acorns retain moisture and go bad. Now she gathers them in plastic bags and transfers them to paper bags so the acorns can dry.

> I had to figure out myself that acorns turn brown after you crack them open. It worried me at first. I also found that after roasting them I cool them and put them in the blender to grind them into flour. Leaching them in the blender, if I only have two or three cups, it works well. I just fill it up with water and pour it off. This way, even if it takes a long time, it makes me feel that I am still doing it the old way.
>
> I try to roast [them] and put [them] in Ziploc bags and stick [them] in the freezer. One by one, I take a bowl and wash them to get all the dirt out and sit in front of my favorite [TV] program or sit outside with my little boy before or after dinner in the beautiful weather and use a rock to crack them. My husband crunches over the shells when he comes home, and the birds—scrub jays—enjoy their share. We have a great cookie recipe and my husband asks, "When does the end product appear?"
>
> There's got to be an easier way than one at a time, but I make myself comfortable. I get a cup of coffee....I work with about six cups of flour at a time, going through different stages. [After shelling I] roast, then blend into a flour, then leach them in a bowl or blender. I use warm water and let it sit. I keep an eye on it and keep going back every half hour. I can get it done in one day. I don't like to boil them; I feel like it boils nutrients out. Once they are leached I spread the flour out onto a tray and bake again in a very low-temperature oven. I love to run my hands through the acorns, it's such a wonderful feeling.

Julie Tumamait-Stenslie, Ojai Day, 2004.
Photo by Jonathan Epstein.

Julie attends the Acorn Festival in Malibu, now in its fourth year, as a storyteller and demonstrator. This year she brought acorns. "The kids stay for almost an hour, cracking and cracking the acorns, twenty kids coming and pounding. There's something very calming, a release of anxiety. The parents say, 'I can't get my kids to leave.'"

Some parents are concerned that acorns could be poisonous. But Julie calmly assures them that the tannic acid is released in the leaching process. She teaches the parents and children that her ancestors learned how to process acorns by watching the animals, who buried them. "I love bringing [our culture] to non-Natives as well as Native children. The public schools are kind of clueless, still teaching history as if we are no longer here," Julie said.

Tribal elder **Patrick Renick,** of the Hopland/Sherwood Pomo Indian Tribe, already has a bucket of tan oak acorns. They're the only ones he gathers. "I'm only sixty-two," he proclaimed, "[but] I don't look my age and don't feel it." When asked if it's the acorns, he said, "Yes, and the seaweed. I gather quite a bit of it."

Born in a hop field in Sonoma County, Patrick said his mom passed away when he was two years old. After that he was raised by Lucy Cooper, his great-great-great-grandmother, who was ninety-eight years old when his mother died.

> We lived on an original dirt floor outside of a makeshift house; we came in the house when [the floor] flooded. We did the acorns as a family thing. My great-great-great-grandfather, Jim Cooper, lived to be 108. I learned everything from them. I didn't speak English, I spoke Northern Pomo.

Patrick is quick to correct himself: "I'd be lying if I said I didn't speak English, because I could cuss good."

Patrick attended the River Union Elementary School in Talmage, near Ukiah. His father, Robert Renick, worked there in the pear orchards as a ranch manager. The family used pear boxes to gather acorns.

> Acorns were a [staple], like wheat, for us. We gathered them on old traditional grounds, usually by the coast. That's originally where we were from; the old people lived way up by Hales Grove, headwaters of the Usal Creek. My Dad would take us up in the farm truck; we had no car. We would drive five hours on a one-and-a-half-lane road.

The road Patrick refers to is the "Willits Road," now Highway 20, a popular road that links 101 to the tourist town of Mendocino, but back then it was "a county road. You couldn't get any speed up, it was mostly gravel and rock; there would be a tree in the middle of the road, we'd have to go around it."

Patrick and his family would pick all day and return home in the evening with three or four 100-pound sacks.

> We'd use regular potato sacks instead of carrying the heavy hop sacks [because] hop sacks are huge. Then we'd empty the potato sacks into the hop sacks. It would take about three hours to pick. Dad was pretty agile and he'd pick fast but the old people were slower.
>
> We made bread and the mush both. We'd crack [the acorns] and let them dry. Kept them dry all the time and then we'd use our mortar to grind them. We'd crack them with rocks [and] before we did that we'd let them dry for a week or so and then we'd put them in a willowing basket, a round, flat basket that was made out of willow or redbud. The husk was like a peanut shell, [and] the wind current would blow the husk away. Then we'd grind it in the mortar.
>
> Today I use a hammer and a thirty-six-inch-high oak stump because I can sit down and do it. If I use a table it will vibrate. It takes about three or four days to crack a 100-pound sack. That's just to crack them. Then I put them in short cardboard boxes and stack [them] in the house by my heater.

To grind the acorns Patrick uses a Cuisinart food processor. "It does two or three cups; it's pretty powerful. Ideally I'd like to get a bread grinder for wheat and things, because I'm trying to get away from the massive work. That's why people don't do it."

Asked about storage, Patrick says, "That's the trick— it's always been really tough [because]

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Ishi's Wife

I fell in with a wild Indian once, in the jail at Oroville (my own presence there being entirely voluntary). Everybody was asking him (in various languages and pantomime) if he had a wife, or knew any women. His reply was to put a turnip in his bucket of ice water, let it sink to the bottom, then motion with his finger and say "pup! pup! pup!" Everybody thought he was saying that his wife was shot or drowned crossing a river, but he was describing the boiling of the acorn mush as the women put rocks in it.

T. T. Waterman. "Indians Devote Hard Work to Meal Grinding: Gathering Acorns for Food Is Talk of Women," The Fresno Morning Republican, June 29, 1924. In C. Hart Merriam's papers at the Bancroft Library.

Konkow woman stone-boiling acorn soup near Bidwell Bar, Butte County, c. 1903. Photo by John W. Hudson, courtesy of the California Department of Parks and Recreation.

they'll get bugs, like flour will. So I put four cups in a Ziploc and keep them in the freezer; that way no bugs will get them." As long as the nuts are dry, they can last for two years before being processed.

If he's really hungry for acorns, however, he'll crack, process, and cook the acorns in one day.

> After I grind them, I'll put them in a strainer...and then I'll turn the water on—cold faucet—and let it barely drip for twenty-four hours and it leaches out. Then you can put it in a pot on very low heat like cornmeal mush, stir once in awhile, [and] in twenty minutes turn it off and let it sit. It will set, kind of like a gel, and once it cools down you can eat it at your leisure.
>
> The day after I make it, I have it in the refrigerator and most of the time I eat it cold, put it in a little bowl. Tan oak is the sweetest of them all. But you can eat black oak and white oak too. You can mix them in there.

Patrick likes to bring acorn mush to elders who get hospitalized because "it cheers them up, and it's really palatable."

> When old Indians go into the hospital the first thing they ask is, "You got any acorn mush?" First I used to fight with the doctors and nurses about it. Then I asked them, "Well, if I prove it, will you let me give them the acorns?" And I'd have a piece of paper in my pocket from UC Berkley that broke it down into different compounds, nutrition-wise.

When it comes to calculating each year's acorn harvest, Patrick says, "You never know. I spend a lot of time prospecting for nuts. You have to go along the road and look and see if they are plentiful or not. We can look up into the trees before they drop. It's funny, sometimes [the oaks] go dormant for a couple years. Where I'm going this year, it's loaded, but I can't tell you. It's a secret!"

The Little Acorn

Translated into Yurok by Aileen Figueroa (Yurok) and Barbara McQuillen

kol' wu-nu-auhl kue woo-mehl
long time ago an acorn
There once was an acorn.

chey-ko' woo-mehl
Little acorn
The acorn was small.

o teyn-pey-wehl
It rained
The rain fell.

u skue-soo ta'-u-nok-seehl
Good the weather come
The sun shined.

o hue-nem' kue woo-mehl
Grew the acorn
The acorn grew.

o hue-nem' kue ue'-werr
Grew the root
The root grew.

o hue-nem' ue kaap
Grew a leaf
Then a leaf grew.

kitch nue-mee-pel' kue woo-mehl
Was very big the acorn
The acorn grew more.

hey-won chey-kenee ho'-mo-no'
At first small tan oak
First it was a small tree.

kitch o nue-mee-pel' kue ho'-mo-no'
Was very big the tan oak
Then it grew into a big tree.

ho'-mo-no' kitch oo okw kue woo-mehl
Tan oak was it had the acorn
The tree grew a new acorn.

cho' pen-noo' kue woo-mehl
Fell to the ground the acorn
The acorn fell to the ground.

kol' wu-nu-auhl kue woo-mehl
Long time ago an acorn
There once was an acorn.

chey-ko' woo-mehl
Little acorn
The acorn was small.

Both pages: Illustrations by Bari Gayle Morehead Talley from *The Little Acorn*.

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Acorn: An Indigenous Curriculum

The Klamath-Trinity Joint Unified School District's Indian Education Program works to create culturally appropriate books to help students learn English as well as the Hupa, Karuk, and Yurok languages. *The Little Acorn* (2002), written by Sarah Supahan and illustrated by Bari Gayle Morehead Talley (Karuk/Yurok), is a good example. The story, about the cycle of growth, fruiting, and rebirth that is the little acorn's as well as humankind's, is as rich and satisfying as the marvelous illustrations. More information about curriculum and books can be found at www.humboldt.k12.ca.us/kt_usd/K-T/indianeducation/curriculum2.htm.

Author Supahan had this to say about her work:

> When my twin daughters were in kindergarten here in Hoopa, I became aware of the difficulties that unfamiliar curriculum can cause children. I remember one worksheet they were given in which they had to find rhyming words. One word they had to rhyme was "pail"—the thing that we always called a bucket. This totally stumped them because they didn't know what a pail was. Later I noticed the mention of such things as "chutes and ladders," elevators, traffic lights, even animals that were unfamiliar to the children in our area. Of course, the things that our kids know and understand in great detail—food such as acorns—were never mentioned. It was at that point that the idea of making books, videos, and curriculum that would be relevant to our own children took "seed" in my mind, so to speak.
>
> Later I found out that there is sound educational philosophy behind the creation of such materials. As Jon Reyhner wrote, "Culturally relevant materials can provide the critical link between prior knowledge and texts that students read. Such materials are absolutely essential if Indian children are to succeed early in their progress toward literacy" (in *Teaching American Indian Students*).
>
> I originally wrote the story to be included in the Karuk Tribe's HeadStart curriculum. I have a real love for children's books and I particularly like what I call "roundabout" tales, where the story begins and ends at the same place, as it does in this book.
>
> We do sell our curriculum, including the books, throughout the state, although the only marketing we do is to have a website and to occasionally set up a booth at an educational conference. Everything we make through curriculum sales goes back into curriculum reproduction or toward the creation of new curriculum.

Oak Trees: Why Indians Reached the Pinnacle of Greatness

JUSTIN FARMER

Receiving Cradle, *'utuwil*, willow, scrub oak, commercial deerskin, 2000, by Justin Farmer (Ipai).

In this twenty-first-century, we seldom give much thought to the use of native woods, other than that wood is the stuff that holds up most trees, and, if it wasn't for trees, where would we get rubber, or maple syrup, or oranges? Fortunately, there are still a few of us old guys around who think in terms of how it was before J. Serra rested his gimpy leg on a boulder in San Diego circa 1769. At that time the Natives were mostly well and happy, and chainsaws hadn't been invented, so a lot of trees were still standing. Indians used oak trees for a great number of purposes, not just to warm the old tipi (*kish*).

If a twenty-first-century person absent mindedly wandered into a museum and bumped into a showcase of early California Indian things, the most striking feature about many of the artifacts there would be the fairly high percentage of items made of or utilizing oak in one form or another. A close look at the step ladder–style cradle will reveal that oak (often *Quercus agrifolia*) was used for both the vertical frame members as well as the horizontal slats. Almost any wood would suffice but coast live oak seemed to be a bit "warmer" than pine or cedar.

Sitting next to the cradle in that same museum case might very well be a throwing stick, or rabbit stick. To the uninitiated, it might look vaguely like a fat boomerang. This implement was used by California Indian people for hunting and killing small to medium game, and for throwing at people you don't like very much. Our rabbit sticks are usually made of interior live oak (*Q. agrifolia*) or "scrub oak" (*Q. dumosa*). These oaks are used because they are extremely tough and will not break when they come in contact with a deer, a rock, or an enemy's head.

Chances are you won't see an agave stick in a museum, because they aren't real pretty. Agave sticks are about three to five feet long, about two inches in diameter, and are sharpened to a point or wedge at one end, kind of like a crowbar. In the spring, desert-dwelling Indians used the stick to pry the heart from either desert agave or yucca (*Yucca whipplei*). These hearts were then roasted in a pit for several days, which converted the plant's starch to almost pure sugar. Oak was used for the agave stick because it is very durable, and a person surely doesn't want his stick to break when the prying gets tough. When available, oak wood was used in the fire pit because it burns so hot and lasts so long. A very similar stick, although shorter, was also used for digging roots and bulbs from the ground.

In pitifully few museums, a visitor might see a shinny stick, which is usually made of oak. "Shinny" is a very ancient ball game in which a wooden ball was thrown, carried, kicked, or otherwise pushed from one end of a field to another by means of a two-and-a-half- to three-foot-long slender club with a cup on the business end. It was used somewhat like a lacrosse stick. Very frequently, the ball was also carved from an oak burl, usually coast live oak.

Although many woods were used in creating hunting ("long") bows, some of the southern California Indians, notably the Chumash, occasionally used coast live oak. If a bow was to be a short-term thing and a guy had minimal self-esteem, it might be made of soft woods like willow, juniper, or even elderberry. However, where a really nice piece of wood was needed to prove how discerning the owner was, his bow might be made of oak. Then if the showoff really wanted to "put on the dog," he might even use oak as a fore-shaft for his arrows.

For culinary purposes, oak was pressed into service when making a variety of utensils such as food bowls, vessels to carry or preserve fire in, tongs for lifting cooking rocks from the fire to the cooking pot, wooden mortars, and as fuel for an exceedingly hot fire. Oak bark was also used for a wide variety of other purposes. When firing clay pottery, latter-day southern California Indians used cow dung ("caca de vaca") because it burns very hot with little or no flame. In pre-"vaca" days (before Spaniards turned these beasts loose into Indian Country), bark from large, dead oaks was used because it burned even hotter that "caca de vaca." Oak bark is occasionally used today in the dyeing process for basketry fibers. Juncus soaked in a mixture of oak bark and rusty iron or elderberry blossoms or even mud produces a jet-black colorfast dye. If oak bark is unavailable, acorns will also do the trick.

According to Paul Campbell, oak ashes have great undiscovered medicinal qualities, and oak galls are good for the eyes, or even for a physic. Paul can make a musical instrument out of a bunch of acorns strung together, or make a top out of an acorn to amuse your kids, and he says that you can string acorns together to make a necklace for a sweet lady or your wife (or for both), that you can tan an animal skin with tannin extracted from oak bark, that you can set the trigger for a trap or snare with a fat, juicy acorn, and that you can suck tannin from an acorn to clear up a raspy throat or a bad cough. If you want, you can even make a tule doll with a face from an oak gall.

In summary, if you can't find a use for your local oak, you aren't really trying.

It Will Live Forever: Traditional Yosemite Acorn Preparation

Beverly R. Ortiz, as told by Julia F. Parker

For over twenty years visitors to Yosemite National Park have watched with fascination as Julia Parker demonstrates one of the most vital aspects of traditional California Indian life—the Yosemite Miwok/Paiute skill of preparing acorn. In this intimate book, Parker describes every step of this intricate and astoundingly nuanced process.

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The Children of the Great Oak

WILLIAM PINK

The Great Oak Tree is located on the reservation of the Pechanga Band of Temecula Luiseño Mission Indians. It is considered to be one of the largest and oldest coast live oak trees in the world, although to actually determine the age of the Great Oak would cause it more harm than the worth of the information. It is unfair to describe this marvelous tree, as one should be able to experience it without any preconceptions. A person could simply say that it is big or it is old, but it is more than just that. It is the memory of all that have visited it.

The popular thought among the tree's admirers is that its age is between 1,500 and 2,000 years. Whatever the number might be, this could not compare with the tree's own majesty. It is the Great Oak.

Surviving for hundreds of years through storms, fires, floods, and sometimes abuse from well-intentioned visitors, the Great Oak must someday face the truth of nature as taught to us by the Wiyot. That truth is that someday we must all die. This is said only between thoughts of hope that the Great Oak Tree will survive for another millennia or two.

The Great Oak, like all other forms of life, makes efforts to reproduce itself, sometimes producing as many as ten thousand acorns in a good year. It is from a single seed or acorn that the Great Oak began its journey through life, a feat difficult to imagine when one stands beneath the tree's vast canopy.

Pechanga Cultural Resources is in the process of developing a program that will aid the many acorns produced by the Great Oak Tree to begin their journey and, hopefully for some, achieve the same results. This program is referred to as "The Children of the Great Oak."

The Great Oak Tree of Pechanga. Photo by William Pink.

Despite the tree's prolific production, the program faces challenges. For one, it is impossible to predict the annual seed production of the Great Oak. There are also important decisions that must be made each year: Should we wait until the seeds drop to the ground or should we harvest them while they still hang from the tree? Should we wait until the seeds germinate before removing them from the sheltering canopy of the parent? There are no simple answers.

In the first year of attempting to germinate as many acorns as possible from the Great Oak, the program came to an abrupt halt when ground squirrels either ate or removed more than two thousand seeds from the nursery bed. This was not the end of the program, however. Returning to the Great Oak in early spring, more than five hundred seedlings were retrieved from beneath the canopy and planted in five-gallon nursery containers. More than half survived.

In the second year of the program all the acorns within reach of people standing on the ground were harvested. This time the seeds were planted in a nursery bed with a wire cloth covering to keep out the squirrels. Soon the seedlings were pointed skyward and growing through their protective cover. On the assumption that the seedlings were safe, it was decided to remove the screen.

But again, the squirrels moved in and began systematically removing and eating the seedlings. In response, the height of the nursery bed was raised and the protective screen was replaced, but soon after replacing the screen the seedlings began dying in a spotty fashion. A

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach C

simple tug on a dead seedling revealed that its root had been removed; the gophers had made their presence known.

The Children of the Great Oak program is now in its third year, but not without familiar problems. Time and patience are required. This year there was plenty of patience but not enough time to harvest the desired number of seeds from the tree. The acorns were allowed to drop to the ground.

The Great Oak has hundreds if not thousands of visitors each year. Unknowingly, these visitors were tramping on the acorns and destroying the seed source. With no time to harvest the seeds from the ground, it appeared that the third year of the program would end without a new crop of seedlings.

Yet although the the third year of the program was presumed over, a visit to the Great Oak provided new hope as more than a thousand seedlings had sprouted beneath the tree's great canopy. Closer inspection revealed that the squirrels had hidden the seeds beneath the ground that was gently tilled by God's little tractor, known as the gopher.

From those single seedlings to clusters of six or seven, it became obvious that the squirrel is a major player in the oak's procreation. More than just stashing a seed in the ground, the squirrel revisits each of the seedlings and removes the nut from the new sprout. Some of the seedlings are also consumed by the squirrels, and the gophers take their share as well. The fact is that we would not have a third year program if it were not for the squirrel and his assistant, the gopher.

With this small success, we eagerly wait to see how the seedlings grow.

The United Auburn Indian Community and Development in Clover Valley

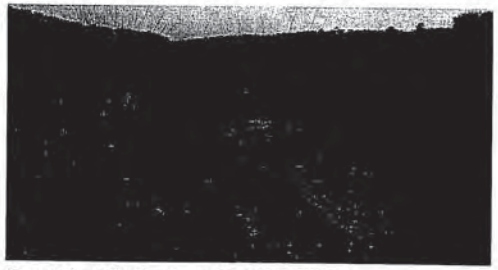
The oaks in Clover Valley, a 622-acre glen located in Rocklin, are stunning in the way that it seems only oaks can be, and the valley's almost hidden location lends itself to a feeling of coming upon an untouched world. Yet touched it is: there are reminders of the large village site that was there in the many grinding rocks, the ball field, and the indications of houses and burial sites. And touched it is, too, by contemporary politics about land use and conservation. The valley is slated for more than six hundred upscale homes, and this development is the subject of much debate.

The nearby United Auburn Indian Community has weighed in on the matter. Tribal Chairwoman Jessica Taveras said that visiting Clover Valley emphasized for her the spiritual connection she and her tribe's members have to the land that is different from non-Indian experiences: "Being at Clover Valley was like finding the Ark of the Convenant." Taveras explained,

> I am both saddened and troubled that the city council is considering a proposed project that would bring more than six hundred homes, five acres of commercial buildings, and a major road to this historical village of the Native peoples of Placer County and a sacred burial place of our ancestors. While I recognize that the issues surrounding the future of Clover Valley are complex, the United Auburn Indian Community urges the council to preserve and protect this pristine jewel of the city.

One of the top priorities for the tribe is preserving cultural sites. The tribe recently committed $25,000 to Placer Legacy, the county's Open Space Preservation Program, to support the program's first year, with additional monies for future years. The United Auburn Indian Community has gone so far as to offer developer Buzz Oates $20 million for the site, but he was not willing to accept this sum. They are hoping to save Clover Valley; if they cannot maybe they can help save another of California's oaken valleys.

Sara-Larus Tolley



Mortars in Clover Valley, Placer County. Photo by Elaine O'Deegan.

Justin Farmer (Ipai) is a retired traffic engineer and self-described "incorrigible collector (and maker) of Mission Indian baskets." He is the author and coauthor of books and articles on cradle boards, deer hunting, and Indian basketry.

Suellen Ocean frequently cooks with acorns and is the author of Acorns and Eat 'Em *and* The Acorn Mouse.

William Pink (Cupeño/Luiseño) is an artist who makes yucca-fiber skirts, bows and arrows, turtle-shell and clam-shell rattles, clay dolls, and abalone-inlaid Cupeño Paviuts, among other things.

Sarah Supahan is the director of the Indian Education Program for the Klamath-Trinity Joint Unified School District and the acting principal of the Yurok Magnet Program at Weitchpec Elementary School.

Bari Gayle Morehead Talley (Karuk/Yurok) is the mother of three girls living on the Klamath River in Orleans. She teaches at the Yurok Magnet Program in Weitchpec.

Sara-Larus Tolley has a Ph.D. in anthropology and has worked on the federal recognition petitions of several California tribes.

News from Native California is published quarterly by the Heyday Institute and can be reached at P.O. Box 9145, Berkeley, CA 94709, (510) 549-2802, nnc@heydaybooks.com.

This special supplement was published with the support of the California Oak Foundation, 1212 Broadway, Suite 842, Oakland, CA 94612, www.californiaoaks.org, and is dedicated to Dr. Sam Assam for his support of oak conservation.

Oak trees near Ukiah. Photo by Sara-Larus Tolley.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach C

LETTER B2
California Oaks Foundation
Janet Santos Cobb, President
August 3, 2007

Response B2-1: The comment asks that the City consider the impact on global warming of removing trees. The removal and replacement of trees is described for all project elements in Section III of the Draft EIR, and the potential impacts of the tree removals are evaluated in the Draft EIR in Sections IV.F, Biological Resources. Supporting documentation in the form of an arborist's report is included as Appendix I of the Draft EIR. The project would result in a net increase in trees as described on page 218 of the Draft EIR. The increase in trees would have a positive, albeit very small effect on the global carbon balance by increasing the amount of carbon-fixing vegetation. This positive effect is identified on page 219 of the Draft EIR.

Response B2-2: The City acknowledges the documents attached to the comment letter. The attachments include a summary of a recent lawsuit settlement that addressed global climate change and, in particular, the impact of converting oak woodland habitat to urban land on climate change. However, the Measure DD Implementation Project would not convert oak woodlands to urban land. The project would create additional park land within an urbanized area, which would have a beneficial, albeit very small effect on the global carbon balance by increasing the amount of carbon-fixing vegetation. This positive effect is identified on page 219 of the Draft EIR. The other attachments to the comment letter provide information about the role of trees in natural, cultural, and recently modified landscapes, the Foundation's plan for managing oak woodlands, and the importance of oaks in California's natural and cultural history. These documents do not provide specific comments on the environmental document and the information contained therein does not affect the analysis or conclusions of the Draft EIR.

Letter
B3

From: matt [matt@gaffneylegal.com]
Sent: Friday, September 07, 2007 5:34 PM
To: Thornton, Elois
Cc: briangaf@aol.com
Subject: Measure DD Implementation Project DEIR Comments

Dear Ms. Thornton,

Please find attached one pdf copy of Friends of the Lake's public comments regarding the Measure DD Implementation Project DEIR. This office has also faxed a copy of these comments to the City of Oakland's Community and Economic Development Agency at 510-238-6538.

Please do not hesitate to contact me if you have any questions regarding these comments.

very truly yours,

Matt McFarland

Matt McFarland
LAW OFFICES OF BRIAN GAFFNEY
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Letter **B3** *cont.*

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September 7, 2007

Via Facsimile and Electronic Mail

Eloise Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA. 94612
facsimile: 510-238-6538
eathornton@oaklandnet.com

RE: Measure DD Implementation Project Draft EIR

Dear Ms. Thornton,

This office represents Friends of the Lake, Nancy Reiser and Ken Pratt (collectively "Friends of the Lake") regarding the City of Oakland's Measure DD Implementation Project Draft Environmental Impact Report ("DEIR.") 1

In summary, this DEIR fails to comply with CEQA because it (1) fails to adequately analyze aesthetic impacts resulting from tree removal; (2) fails to adequately analyze wildlife and biological resources impacts resulting from tree removal; (3) fails to adequately explain how proposed mitigations will reduce project impacts to a less-than-significant level; and (4) fails to adequately analyze cumulative impacts. Further, there is substantial evidence of potentially significant environmental impacts resulting from the proposed project's tree removal. For these reasons, the Draft EIR fails to fulfill the purpose of California Environmental Quality Act ("CEQA") to provide informed public participation and informed decision making. 2

Please continue to include both this office and Friends of the Lake, in any further communications to the public on this proposed project.

Sincerely,

Matt McFarland

cc: Friends of the Lake

Letter
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cont.

I. THE DEIR FAILS TO ADEQUATELY ANALYZE AESTHETIC IMPACTS RESULTING FROM TREE REMOVAL.

The DEIR fails to adequately analyze aesthetic impacts resulting from tree removal. A project will have a significant aesthetic impacts if the project will (1) have a substantial adverse effect on a scenic vista; (2) substantially damage scenic resources, including trees; or (3) substantially degrade the existing visual character or quality of the site and its surroundings. (CEQA Guideline, Appendix G; DEIR at 335.) Here, the proposed project will result in the removal of 259 trees, including the removal of 129 protected trees and 8 protected oak trees, around Lake Merritt and the Lake Merritt Channel. (DEIR at 218.) Nevertheless, the DEIR fails to adequately analyze whether the proposed tree removal will result in significant aesthetic impacts. 3

First, the DEIR fails to adequately analyze whether the removal of 259 trees, including 129 protected trees, will adversely affect a scenic vista. The DEIR determines that Lake Merritt and the Lake Merritt Channel are resources that are part of scenic views seen from numerous locations in Oakland. (DEIR at 336.) The DEIR then states that "[t]he project would result in the removal of certain *diseased trees* from the vicinity of the Lake; however, the removal of these trees would not substantially change scenic vistas [because] [n]ew trees would be planted to replace the trees that are removed." (*Ibid.*, emphasis added.) Yet, the DEIR fails to explain why the planting of new trees automatically leads to the conclusion that the project will have a less-than-significant impact on a scenic vista. Given that the DEIR's Arborist Report determines that the trees slated for removal are "generally mature in development," the DEIR's failure to proffer any explanation is a glaring omission. (*See* Appendix I to the DEIR, Executive Summary.) In addition, an EIR must (1) analyze impacts, (2) determine if the impacts are significant, and (3) discuss mitigations. By combining the discussion of mitigations (*i.e.*, the planting of new trees) with the analysis of impacts (*i.e.*, the removal of trees), the DEIR fails to engage in the analysis determination of significance required by CEQA. 4 5

Further, although some of the trees proposed for removal are diseased, the majority of the trees are not. The City's own April 11, 2006 "Tree Permit CEQA Explanation" says that only 31 of the 224 trees proposed for removal in conjunction with the Lakeside Drive (CT05-004), Lakeshore Avenue and El Embarcadero (CT05-005), and 12th Street Reconstruction Project (CT05-006) are dead, severely damaged or represented a significant hazard. (*See* April 11, 2006 Tree Permit CEQA Explanation at 5, 6

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cont.

attached hereto.) Likewise, the Hortscience Arborist Report included as Appendix I to the DEIR concludes in its Executive Summary that, among 269 trees slated for removal, only 6 are dead but 78 are in good or excellent condition. The Arborist concludes that 84 are in "poor condition" but not that they are diseased. Neither the DEIR nor the Executive Summary discusses the remaining 91 trees. Nevertheless, the DEIR limits its discussion to the removal of "diseased trees" and fails to analyze the impact to scenic resources resulting from the removal of healthy trees or trees in good or excellent condition.

6 cont.

Second, the DEIR fails to adequately explain why the removal of 259 trees, including 129 protected trees, will have a less-than-significant impact on scenic resources. Again, the DEIR states that "[m]any of the trees that would be removed are diseased, short-lived, or are not stable," but fails to mention that over half the trees proposed for removal are healthy. (DEIR at 341.) The DEIR then summarily concludes that "[a]lthough some of the trees that would be removed contribute to the scenic quality of the Lake, this contribution is not significant. Therefore, the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources." (DEIR at 341.) The DEIR violates CEQA by failing to explain how it reached the conclusion that the trees slated for removal do not significantly contribute to the scenic quality of Lake Merritt and its surroundings.

7

Third, the DEIR fails to analyze the visual quality impacts to Lake Merritt and its surroundings resulting from the removal of 259 trees, including over 150 healthy trees. The DEIR determines that tree removal will have a less-than-significant impact on visual quality because "landscaping and trees in poor condition would be removed and replaced with new plants that would enhance the visual environment." (DEIR at 342.) Again, the DEIR fails to analyze why it reaches the conclusion that removal of large and mature trees surrounding Lake Merritt and replacement with smaller and younger trees will not adversely impact visual quality.

8

Fourth, numerous commentors have previously stated that the removal of over 200 mature trees around Lake Merritt and the Lake Merritt will result in significant visual quality impacts, and the planting of new trees will not mitigate the impacts. (*See*, *e.g.*, Public Comments on Channel EIR and on Tree Permits CT05-004, CT05-005 & CT05-006, attached hereto.)

9

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cont.

II. THE DEIR FAILS TO ADEQUATELY ANALYZE PROJECT-SPECIFIC WILDLIFE AND BIOLOGICAL RESOURCE IMPACTS RESULTING FROM THE TREE REMOVAL AUTHORIZED BY THE LAKE MERRITT PROJECTS.

The DEIR fails to adequately analyze project-specific wildlife and biological resource impacts resulting from the removal of 259 trees, including 129 protected trees and 8 protected oak trees, around Lake Merritt and the Lake Merritt Channel. (DEIR at 218.) A project will have a significant impact on wildlife/biological resources if the project will have a substantial effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special-status species; or (2) interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (CEQA Guideline, Appendix G; DEIR at 210.) 10

Here, the DEIR admits that Lake Merritt and the Lake Merritt Channel support a wide variety of waterbirds, including Barrow's goldeneye, which is considered uncommon in California and is a California Species of special concern. (DEIR at 189.) Likewise, the trees around Lake Merritt provide perch sites and potential nest sites for common raptors such as the red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl. (*Ibid.*) Such trees could also support Cooper's hawk. (*Ibid.*) In addition to Barrow's goldeneye and Cooper's hawk, four other special-status bird species have been observed at or near Lake Merritt and/or the Lake Merritt Channel, including the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, and the Alameda Song Sparrow. (DEIR at 195–96.) 11

The DEIR fails to adequately analyze impacts to each special-status bird species potentially occurring in the Lake Merritt area. The DEIR admits that "numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk," and "[p]roposed tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-skinned hawks by removing trees that *support active nests*." (DEIR at 211, emphasis added.) However, the DEIR summarily concludes that "[i]mplementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-

Letter
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cont.

skinned hawks to a less-than significant level." (DEIR at 212.)[1] An EIR must (1) analyze impacts, (2) determine if the impacts are significant, and (3) discuss mitigations. Again, the DEIR improperly combines the discussion of mitigations (*i.e.*, implementation of Condition of Approval 32) with a cursory analysis of impacts to the Cooper's and sharp-skinned hawks. By relying on Standard Condition of Approval 32 the DEIR fails to follow the procedure proscribed by CEQA and avoids determining the significance of impacts to special-status bird species resulting from the proposed tree removal. 12

Further, there is no analysis addressing the impacts of proposed tree removal on the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, or the Alameda Song Sparrow, despite the DEIR's admission that these special-status species have been observed at or near Lake Merritt and the Lake Merritt Channel. (DEIR at 195–96.) Thus, the DEIR fails to specifically analyze the impacts to special-status species resulting from tree removal around Lake Merritt. 13

Also, the DEIR does not disclose potential adverse impacts to raptors, such as the red-tailed hawk and red-shouldered hawk. 14

Finally, the removal of 259 trees around Lake Merritt and the Lake Merritt Channel may violate Fish and Game Code section 3503.5, which makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons. Birds of prey in the order Strigiformes include owls. The DEIR admits that the trees around Lake Merritt provide perch sites and potential nest sites for the red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, barn owl, Cooper's and sharp-skinned hawks, and American Peregrine Falcon. (DEIR at 189.) Thus, the proposed tree removal may result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds in violation of Fish and Game Code section 3503.5. At a minimum, prior to EIR certification, the City should survey the trees for nests of raptors and owls and disclose this information in the EIR to allow informed decision-making. 15

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[1] The DEIR also violates CEQA by failing to identify and analyze such mitigations, including their feasibility. For example, Condition of Approval 32—which the DEIR includes as a mitigation without identifying it as such—will only be implemented "to the extent feasible." (DEIR at 207.) 16

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cont.

III. THE DEIR FAILS TO EXPLAIN HOW COMPLIANCE WITH THE CITY'S TREE PRESERVATION AND REMOVAL ORDINANCE WILL MITIGATE IMPACTS RESULTING FROM TREE REMOVAL.

The DEIR determines that any potentially significant adverse impacts resulting from the removal of 259 trees—including 129 protected trees and 8 protected oak trees—around Lake Merritt and the Lake Merritt Channel will be mitigated through compliance with the City's Tree Preservation and Removal Ordinance. (DEIR at 218–19.)

The DEIR's determination that compliance with the Tree Preservation and Removal Ordinance will—in and of itself—mitigate potentially significant impacts is contradicted by both the City's Estuary Policy Plan ("EPP") EIR and the Land Use and Transportation Element ("LUTE") EIR, which state that "[a]lthough Oakland's tree removal ordinance requires a permit before large trees are removed, adverse impacts are still possible." (LUTE EIR at III.H.19 & EPP EIR at III.H-6, attached hereto.) Thus, the EPP EIR and the LUTE EIR disclose that compliance with the Tree Preservation and Removal Ordinance does not necessarily mitigate potential adverse environmental impacts. The DEIR fails to explain how compliance with the Ordinance will mitigate potentially significant impacts here. **17**

IV. THE DEIR FAILS TO ADEQUATELY ANALYZE CUMULATIVE IMPACTS.

The DEIR violates CEQA because it fails to adequately analyze cumulative impacts. CEQA requires that the DEIR consider past, present and reasonably foreseeable future projects when analyzing cumulative impacts. (*Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 114; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 720-721; CEQA Guideline § 15130.) This DEIR's cumulative impacts analysis is inadequate because it (1) uses the wrong standard for cumulative impact analysis; (2) completely excludes any consideration of past or present projects; (3) limits its analysis to project-specific impacts; (4) reaches its conclusion of less-than-significant cumulative aesthetic impacts based on the proposed project's "contribution to" cumulative aesthetic impacts; (5) erroneously assumes mitigations for future projects will eliminate potential cumulative impacts; and (6) repeatedly provides conclusions rather than analysis. **18**

A. The DEIR Utilizes the Wrong Standard When Discussing Cumulative Impacts. **19**

CEQA requires that the DEIR consider past, present and reasonably foreseeable future projects

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cont.

when analyzing cumulative impacts. (CEQA Guideline § 15130.) Conversely, this DEIR states that "CEQA allows the use of *either* a list of past, present or reasonably anticipated relevant projects. . . *or* a summary of projections in an adopted planning document." (DEIR at 363, emphasis added.)

The plain language of CEQA demonstrates that a "summary of projections" is a not a substitute for an adequate discussion of cumulative impacts. CEQA distinguishes between a "summary of projections" and an actual analysis of the cumulative impacts of the project together with past, present and future projects. The CEQA Guidelines state that an EIR must include *both* a summary of projections (Guideline 15130, subd. (b)(1)) and an analysis of the cumulative impacts of the relevant projects. (Guideline 15130, subd. (b)(5).) Nevertheless, this DEIR only considers a summary of projection. (*See* DEIR at 363.) While a summary of projection is a proper starting point for a cumulative impact analysis, such a summary—in the absence of any analysis of cumulative impacts—does not provide the substantively meaningful cumulative impact discussion CEQA requires.

19 cont.

B. The DEIR Fails to Analyze Past or Present Projects.

The DEIR fails to analyze any past or present projects in considering cumulative impacts. The DEIR states that its cumulative impact analysis "considered development that is likely to occur under the build-out of the City of Oakland General Plan." (DEIR at 363.) In the areas of Public Services and Recreation, Utilities and Infrastructure, and Aesthetic Resources, the DEIR only considered "buildout of cumulative projects" (Public Services), "other reasonably foreseeable projects in Oakland" (Utilities), and "projects that would be developed as part of General Plan build-out" (Aesthetics). (DEIR at 365–66.) By limiting its analysis to "build-out" and "other foreseeable projects," the DEIR fails to consider past and present projects as part of its cumulative impacts analysis as required by CEQA.

20

C. The DEIR Limits Its Cumulative Impacts Analysis to Project-Specific Impacts.

In the areas of cumulative Transportation, Air Quality, Geology, and Hazards and Hazardous Materials impacts, the DEIR impermissibly limits its analysis to project-specific impacts. In the area of cumulative transportation impacts, the DEIR determines that "the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impacts." (DEIR at 364.) For cumulative Air Quality impacts, the DEIR states that "the project is consistent with the General Plan; therefore the project would not have a significant cumulative impacts." (*Ibid.*) For cumulative Noise impacts, the DEIR determines that "site-specific" noise impacts

21

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cont.

would not result in significant cumulative construction or operational noise impacts. (*Ibid.*) For cumulative Geology impacts, the DEIR concludes that there are no cumulative effects because "the proposed development does not influence or degrade conditions in the area, as long as the impacts of the individual components are reduced to a less than significant level." (DEIR at 365.) For cumulative Hazards impacts, the DEIR concludes that because the "hazards and hazardous materials issues for the proposed project are specific to the individual component sites," there are no cumulative impacts." (*Ibid.*)

21 cont.

In each instance, the DEIR fails to comply with CEQA as it limits its analysis to project-specific impacts and fails to consider the cumulative impact of the project together past, present and reasonably foreseeable future projects. This failure is particularly egregious given that the DEIR recognizes that "Section 15130 of the *CEQA Guidelines* requires that an EIR evaluate potential environmental impacts that are individually limited, but cumulatively significant." (DEIR at 363.) Conversely, this DEIR incorrectly assumes that if project-specific impacts are individually limited, then there is no cumulative impact.

D. For Aesthetics, the DEIR Erroneously Bases Its Conclusion On the Project's "Contribution to Aesthetic Impacts."

For cumulative aesthetic impacts, the DEIR erroneously bases its conclusion of less-than-significant cumulative impacts by determining whether the project will "contribute to" adverse aesthetic impacts. (DEIR at 366.) The DEIR concludes that there will be no significant cumulative aesthetic impacts because "the proposed project would not make a significant cumulative contribution to aesthetic impacts in Oakland and the region." (*Ibid.*) Thus, the DEIR improperly analyzed the significance of the project's contribution to cumulative effects rather than the collective significance of all closely related projects, as required by CEQA.

22

E. The DEIR Erroneously Assumes that Mitigations For Undefined Future Projects Will Eliminate Potential Cumulative Impacts.

In the areas of cumulative Biological Resources, Hydrology and Water Quality, and Hazards and Hazardous Materials impacts, the DEIR erroneously assumes that mitigations for undefined future projects will eliminate potential cumulative impacts. In each instance, the DEIR "anticipates" that "other cumulative projects within the City of Oakland" would be required to implement the same mitigation measures proscribed for the Measure DD projects and, therefore, implementation of the proposed project

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cont.

would not result in significant cumulative impacts. (*See* DEIR at 364–66.) Not only does the DEIR fail to define, identify or discuss what constitutes a "cumulative project within the City of Oakland," but the DEIR also provides no analysis explaining why or how it determined these "cumulative projects" would be required to implement the proposed mitigations nor how these mitigations, if implemented, will reduce cumulative impacts to less-than-significant.

23 cont.

F. The DEIR's Cumulative Impact Discussion Provides Conclusions Rather Than Analysis.

In many of the impact areas contained in the DEIR's cumulative impact discussion, the DEIR provides conclusions rather than analysis. At no point does the DEIR specifically analyze the impacts of the project together with the impacts of past, present or reasonably foreseeable future projects. For example, in the Land Use section, the DEIR states that site-specific impacts "would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts." (DEIR at 363.) This is a conclusion, not the analysis required by CEQA. In the areas of Public Services and Recreation and Utilities, the DEIR concludes without analysis that because the Measure DD Implementation Project together with future development is anticipated in the General Plan, there will be no significant cumulative impacts. Likewise, in the areas of Transportation, Air Quality, Biological Resources, and Hydrology and Water Quality, the DEIR determines less-than-significant cumulative impacts but either provides no analysis that supports this conclusion, or reaches this conclusion based on cursory, project-specific analysis.

24

V. THERE IS SUBSTANTIAL EVIDENCE OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS RESULTING FROM THE PROPOSED TREE REMOVAL.

There is substantial evidence that the proposed tree removal may have a significant effect on the environment. First, there is credible substantial evidence of potentially significant aesthetic impacts resulting from the removal of 259 trees—including 129 protected trees and 8 protected oak trees—around Lake Merritt and the Lake Merritt Channel. The DEIR determines that Lake Merritt and the Lake Merritt Channel qualify as scenic vistas and that the trees slated for removal contribute to the

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cont.

scenic quality of Lake Merritt. (DEIR at 336 & 341.) At least 150 of the trees proposed for removal are healthy trees, and the City's own Arborist Report only identifies 6 trees that are dead. (*See* Appendix I, Executive Summary.) Given that Lake Merritt and the Lake Merritt Channel qualify as scenic vistas and given that trees slated for removal contribute to the scenic quality of Lake Merritt, there is substantial evidence that the removal of 259 trees around Lake Merritt and the Lake Merritt Channel may result in significant aesthetic impacts.

25 cont.

Second, there is substantial evidence that the proposed tree removal may result in significant land use impacts. A project may have a significant land use impact if it conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. (Guidelines, Appendix G.) The removal of 129 protected trees, including 8 protected trees, will conflict with OSCAR Policy CO-7.4, which "discourages the removal of large trees." (*See* OSCAR Neg. Dec. at 20; *see also* EPP EIR at III.H-6.) Because the proposed removal with conflict with OSCAR Policy CO-7.4, there is substantial evidence of potential land use impacts.

26

Third, there is substantial evidence that the proposed tree removal may result in significant impacts to wildlife and biological resources. As previously discussed, the DEIR itself admits that a variety of native and special-status bird species are found in and around Lake Merritt and the Lake Merritt Channel, including the Cooper's and sharp-skinned hawks, the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, and the Alameda Song Sparrow. (DEIR at 189–96.) Likewise, the Lake Merritt Channel Wetlands and Widening Project Draft EIR—which purports to analyze the effects of tree removal associated with the 12th Street project—determined that the removal of only 31 Protected Trees from Lake Merritt would have a significant impact on wildlife

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cont.

and biological resources. (Channel EIR at 4.1-27, attached hereto.) The DEIR admits that potential tree removal within Lake Merritt and the Lake Merritt Channel could directly impact nesting Cooper's and sharp-skinned hawks by removing trees that support active nests. (DEIR at 211.)

27 cont.

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ATTACHMENT A

Explanation of Environmental Review Completed for Tree Permits
 # CTO5 – 004 Lakeside Drive
 # CTO5- 005 Lakeshore Avenue and El Embarcadero
 # CTO5- 006 12th Street Reconstruction Project

Background and Description of Previous Environmental Review: In 2002, an Initial Study for Measure DD (Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure) was completed, with the finding that the identified potential environmental impacts as a result of the project were within the range and scope of the impacts previously studied in the environmental documentation completed for the General Plan Land Use and Transportation Element EIR, the Estuary Policy Plan EIR, the Open Space, Conservation and Recreation Element Mitigated Negative Declaration and the Coliseum Area Redevelopment Plan EIR.

The California Environmental Quality Act (CEQA) Guidelines Section 15162 requires the Lead Agency (the City of Oakland in this case) to determine whether three conditions are present when applying previous environmental documentation:

1) *Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;*

2) *Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions to the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or*

3) *New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:*

   a) *The project will have one or more significant effects not discussed in the previous EIR or negative declaration;*
   b) *Significant effects previously examined will be substantially more severe than shown in the previous EIR;*
   c) *Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measures or alternative; or*
   d) *Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the proponents decline to adopt the mitigation measure or alternative.*

None of these three conditions were present at the time of the June 2002 Initial Study, given the level of general information and project descriptions known at the time for each of the Measure DD projects. The circumstances under which the projects were to be undertaken were the same as in 2002; funding had been allocated and all policies and programs as set forth in the

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Addendum with regard to standard conditions, construction management and best practices were the same. The water quality requirements and standards under the Regional Water Quality Control Board and Alameda County have been updated, and this represents a more stringent set of standards and requirements for water quality protection and erosion control. The design development process accounted for these changed standards and circumstances and they are not considered significant. Therefore, an Addendum to these documents was prepared and approved by the Oakland City Council in June 2002. Both the Lake Merritt Master Plan and the conceptual plans for the Measure DD Projects (12th Street reconstruction, realignment and other work for Lakeshore Avenue and Lakeside Drive) included tree removal and re-landscaping due to the age and the poor condition of many trees.

Current Review Process and Comparison of 2002 Projects with the Design Development of Construction Documents for the Projects. In 2004, detailed plans and specifications began to be prepared for restoration and improvement of Lake Merritt Park, the 12th Street Reconstruction Project and related access, landscaping and other public improvements. During the next 18 months, three detailed tree surveys were completed, along with a biological assessment (roosting and nesting habitats). Landscaping and revegetation plans were also completed. In addition, public meetings were held and construction plans were revised and altered in order to reduce tree loss. The following table presents a comparison between the 2002 general description and the detailed description for the main components of the three projects under consideration for the tree permit.

Project and Major Components - 2002	*2006 Description as the Result of Completion of Analysis and Design Development Drawings*
12th Street Reconstruction -Replace 12th Street 12-lane viaduct with a new 6-lane boulevard connection to 11th, 12th Street with 1st Avenue, between Oak Street and International Blvd., thereby creating four new intersections – 13th-14th Streets., 12th-14th Streets., 12th Street with Kaiser Center and 12th Street with East 12th Street. -Replace 12th Street culvert at Lake Merritt Channel with an arched bridge to increase tidal flow into and flushing of Lake Merritt. -Repair or replace Lake Merritt retaining walls -Widen Lake Merritt borders and paths to add bike lanes by reconfiguring perimeter streets -Implement system-wide improvements – including paths, restrooms, landscaping and reforestation and signs	**Tree Permit Reference CT05-006** -No substantial changes to those proposed in original project description -Remove approximately 179 trees
Lakeshore - El Embarcadero Modifications -Modify existing El Embarcadero into one road with two-way operation. The unused portion of the roadway would be converted into more parkland. -Widen the Lake Merritt Park borders and paths to add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue).	**Tree Permit Reference CT05-005** -Lakeshore Avenue modified from four to two lanes plus two bike lanes and a wider park area. -New street section reduces Lakeshore Avenue by approximately 12 feet (similar to what was proposed) -Remove approximately 20 existing trees.

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Municipal Boathouse Renovation and adjacent Lakeside Drive Improvements -Renovation of the Municipal Boathouse with a new accessory building for boat storage, including hazardous materials clean-up. -- -Modification of the parking lot for better access and improved shoreline access. -Modify and reconfigure borders to increase park areas; renovate surrounding areas with new sod and irrigation. -Implement system-wide improvements – including paths, restrooms, landscaping and reforestation and signs. -Narrow a portion of one-way Lakeside Drive from 14th to 17th Streets from four travel lanes to three lanes. Add a northbound bike lane in the segment from 14th Street to 17th Street.	**Tree Permit Reference CT05-004** -Restroom proposed to be outboard of historic structure due to design and public safety reasons. -Remove approximately 25 existing trees.

General Work Signs, compliance with Americans with Disabilities Act and State requirements, minor traffic safety and pedestrian safety improvements as appropriate.	These details were incorporated as part of standard design development work and are required by Federal, State and local laws.

CEQA Review as Part of the Tree Permit Process. Per the requirements of OMC Chapter 12.36 – Protected Trees, three tree permit applications were submitted and the Planning Department reviewed the detailed project descriptions, all information and analysis, including detailed tree surveys, a biological assessment and re-planting plans. A review of the 2002 Addendum was also completed, comparing the new information and analysis with the conceptual plans relied upon for the preparation of the Addendum and the current, more detailed project descriptions. In addition, the currently described projects (above) were reviewed for the three criteria under CEQA Guidelines Section 15162. None of the above-described changes constitute new information that necessitates preparation of further environmental review as specified in CEQA Guidelines Section 15162. Specifically, the proposed lane reduction to the segment of Lakeshore Avenue has been reviewed and the operational levels of service will not significantly change. The 2002 project descriptions called for modifications to the configuration of Lakeside Drive, Oak Street, and Harrison Street. The 2006 project descriptions are more specific and have been developed with more detailed geometric information and traffic engineering information to confirm no greater impact will result.

The circumstances under which the project will be constructed remain essentially the same. Other than infill residential development that was previously projected in the 2002 traffic review, the only major change is the elimination of a previously approved 730,000 square foot office tower located at Grand and Harrison (as part of the Kaiser Planned Unit Development). Instead, the Cathedral of Christ the Light is under construction in that location. The difference in these projects from a traffic standpoint is that there will be a significant reduction in weekday a.m. and p.m. peak hour traffic and a slight increase in Sunday traffic counts. The weekday traffic reduction is considered to be a beneficial change and the Sunday traffic increase is not considered to be significant and will fall well within the weekday peak hour traffic counts. No substantial changes in the project or circumstances under which the project will be undertaken were identified except with regard to the following issue:

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Removal of Protected Trees. The 2002 Addendum states that no removal of protected trees is anticipated. Upon review of the most recent tree surveys, up to 164 protected trees were proposed to be removed.

The results of the tree survey found that many of the trees were in deep distress, with obvious disease, trunk decay, or other vulnerability due to physical condition or age. The detailed tree surveys also confirmed the information and analysis in the adopted Lake Merritt Master Plan (6/02), page III-29, "Many of the Park's trees are at the end of their life span; the age of most forested sections of Lake Merritt is 87 years. Over-mature trees are susceptible to pests and diseases, wind damage and hazardous weakening effects."

Further public meetings, tree survey work and plan revisions were completed. As a result, the following changes were made to the tree removal and re-landscaping plans:

Project Name (Tree Permit #)	**Total Trees proposed to be removed 11/05**	**Current Tree Removal Estimate 1/05** <u>**Protected**</u> **Unprotected**	**Existing trees to Remain (protection measures applied)**	**New trees to be planted**	**Net gain and percentage increase**
Lakeside Drive CT0 5-004	37	<u>20</u>	32	61	41 (79%)
Lakeshore/ Embarcadero CTO5-0005	35	<u>8</u> 17	78	119	94 (91%)
12th St Project CTO5-006	235	<u>136</u> 43	168	341	162 (47%)
Totals:	307	224	278	521	297 (59%)

The Lake Merritt Master Plan sets forth the goal of a comprehensive re-forestation program with the following components: public information, native plant preservation, specimen tree replacement, reforesting high use areas, adequate tree maintenance and reforesting plant communities. The landscaping plans and replanting plans as part of the three projects serve as a major implementation of these goals. There is a significant increase in the number of new trees planted, with a net gain of 297 compared with 224 proposed for removal. Moreover, through the review process, 83 trees originally scheduled for removal were able to be preserved through revisions to the plans. In particular, a grove of redwoods will be preserved as part of the channel restoration for the 12th Street Project. As a result, the new information reviewed in connection with the tree permit application does not yield evidence of new significant impacts associated with the loss of protected trees, nor a substantial increase in the severity of environmental impacts previously studied.

With regard to the potential biological impacts, a survey confirmed that none of the trees proposed to be removed constituted significant habitat value (roosting or nesting). No significant biological impacts will result from removal of the trees.

Given this information and analysis, the Planning Director determined that none of the circumstances necessitating preparation of a subsequent or supplemental EIR are present. Moreover, the three tree permits are exempt from further CEQA review based on the findings set

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forth in OMC 12.36.070 E pertaining to total extent of requested removals and the size of the trees proposed to be removed:

1) The loss of up to 224 total trees (168 protected, 60 unprotected) represents approximately 44 percent of the total trees within the defined project areas for the three tree permits, and approximately 9 percent of the total trees in Lake Merritt Park. Through changes to the plans and the institution of tree protection measures, the number of trees to be removed was reduced by approximately 27 percent or 83 trees.

2) Sufficient preservation efforts have been taken to preserve large trees.

3) Of the 224 total trees proposed for removal, 31 were dead, severely damaged or represented a significant hazard. The remaining 195 trees were identified for removal in order to achieve better drainage and to accommodate foundation work and construction of new stairways and other access features according to federal, state and local standards. In addition, tree removal was also required for retaining wall repair and the realignment of 12th Street.

Reference documents:

2002 Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Addendum

Tree Permit Surveys dated 1/24/06

Picture files of damaged trees and trees near significant park improvements (retaining walls, building foundations)

Plans for the 12th Street Reconstruction Project, El Embarcadero, Lake Merritt Park Improvements, and Lakeshore and Lakeside Drive

Wildlife Habitat Value Assessment, by LSA Associates, dated January 27, 2006

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Garcia, Cecilia

From: Toni Veglia [toni@usenix.org]
Sent: Sunday, January 22, 2006 10:58 AM
To: cgarcia@oaklandnet.com
Subject: Lake Merritt Tree Removal

As a resident and property taxpayer in Oakland, I was shocked to hear about the proposed removal of trees that are not deemed "valuable" to the small group of decision makers. I go by the lake at least three times a week, and I appreciate all of the trees. That a small group of non-elected people can make this decision that negatively affects the quality of life for so many others is absurd. I am not pleased that my taxes are going towards making my city LESS livable instead of more inviting. There needs to be more rather than less greenery in this town. Do NOT cut down the beautiful old healthy trees.

-Toni Veglia
3308 Birdsall Ave
Oakland, CA 94619

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Garcia, Cecilia

From: James Burks [takodi@earthlink.net]
Sent: Saturday, January 21, 2006 8:08 AM
To: CGarcia@Oaklandnet.com
Subject: Destruction of Lake Merritt Trees

Members and Staff

I am in total disagreement with your plans to destroy over 260 trees in the Lake Merritt area. What is the real rational or gain from this action. Many citizens, as you are aware, think the use of funds for this purpose is absurded and not necessary.

Lake Merritt is a beautiful place. Do the right thing by it. Plant more trees and attractions. This city could certainly use. Divert your energy and expertise towards a project more viable. There are so many other major issues and concerns to keep you busy other than destroying a natural and wonderful surrounding.

For instance, in my community near Concordia Park, there are many plans to upgrade, build structures (ie Girls, Inc.) and more. However, I called 615-5566 recently to make you aware of the blight associated with the new tennis and basketball facilities there. I use those fgacilities and would hate to see them destroyed by vandals. As I travel throughout the city, thee are many, many other areas that require your attention, funding and caring to make them better, especially for the kids.

I urge you to redirect and or abort your plans to remove these trees. Have a little love in your heart versus political gain, career advancement, bureaucratic notification. Let them be.

Thank you for your consideration.

James Burks
Citizen

James Burks
takodi@earthlink.net
Why Wait? Move to EarthLink.

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Garcia, Cecilia

From: Kirkwood, Earla, LPRD [EKirkwood810@Worldsavings.com]
Sent: Monday, January 23, 2006 8:11 AM
To: CGarcia@Oaklandnet.com
Subject: TREES AT LAKE MERRITT

My husband and I are sending this e-mail to protest the mass cutting of trees around Lake Merritt. While some trees may require attention, the cutting of so many mature trees will impact both the look and feel of Lake Merritt. As city residents, tax payers, voters and active people who walk around the Lake on a daily basis, we have noticed the red markers on so many trees. Surely, there is a better way to improve Lake Merritt than the mass cutting of so many mature trees.

We agree with the planting of new trees but feel strongly they can exist with the mature trees. Besides chancing the look of the Lake it will seriously impact the eco system in place that provides shade, is a haven for birds and squirrels and in general makes up a part of the "jewel" of Oakland. A win - win situation for Oakland.

Thank you.

Michael J. and Earla D. Kirkwood
2751 Maxwell Avenue
Oakland, Ca 94619

****
If you are not the intended recipient of this e-mail, please notify
the sender immediately. The contents of this e-mail do not amend
any existing disclosures or agreements unless expressly stated.
****

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Garcia, Cecilia

From: Betsy Milligan [betsyjr@sbcglobal.net]
Sent: Saturday, January 21, 2006 2:16 PM
To: CGarcia@Oaklandnet.com
Subject: Concerning Lake Merritt tree cutting

Hello,

I have lived in Oakland since 1975. Of the many reasons I chose this city, one was the beautiful trees. I bought a home here in 1983... that's how much I love this place.

I sadly heard about the plan to cut down trees around Lake Merritt for a varity of reasons. I was horrified at some of the reasons. Some may have merit, however... many of the reasons are just downright stupid.

We live in a disposable society. Most of these trees are older than the people on the City Payroll. What right do you have to cut down a 100 year old tree cause it's in the wrong spot or perhaps... we "plan to put a path there"... ???? New trees can still be planted. But existing ones should be allowed their natural cycles. They create the unique and lovely environment that makes Lake Merritt a jewel of our City.

After all, the very SYMBOL for Oakland is a LARGE OLD TREE!

Staggering the planned cuts is also smarter and healthier.

Obviously... the people planning this have no clue as to the value old trees bring to city.

Betsy Milligan
(510) 531-4409

Opposed

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Honora Hunter
310 Lee Street
Oakland, CA 94610

Dan Gallagher, Tree Supervisor
Public Works Agency Administration
City of Oakland
250 Frank H. Ogawa Plaza, Suite 4314
Oakland, CA 94612

1/12/2006

Dear Mr Gallagher:

I would like to express my concern that certain trees around Lake Merritt are due for removal when there is no biological reason for doing so. I do not think that convenience or "tight landscaping" are adequate reasons to remove otherwise healthy mature trees. I understand that the vast majority of the trees slated for removal are diseased or do not have the lifespan to warrant keeping them, however others are perfectly healthy and appropriate for the environment.

The trees that I feel should NOT be removed are as follows:

Tea Trees (Reconstruction of the retaining wall should be engineered AROUND these trees that undoubtedly contribute to the integrity of the soil. I am a local artist, and one of my subjects is the Tea Trees around Lake Merritt.)
LD-26 through LD-28
LD-31 through LD-41
Pines and Poplar (Healthy but not perfectly pruned. I'd rather ugly and natural to perfectly pruned and anal-retentive landscaping.)
LS-65 **LS-89**
LS-95 **LS-101**

Two more comments…I was wondering if it might be possible to move the Magnolias from in front of the Kaiser Convention Center to a location somewhere around the lake, rather than paying to store them or just killing them; also, I was wondering if it would be possible to construct simple (or elegant and artistic) benches from the stumps of trees that are slated for removal. Even one bench made from a stump would be a destination for lake-folk and would be appreciated as a way to preserve some of the history encapsulated by the older trees.
The plans otherwise look pretty good. I'm especially excited about the 12th Street Project. Thank you for considering my requests, and I wish you good luck with your work.

Sincerely,

Honora Hunter
10 year Lake Merritt resident

cc Councilmember Pat Kernighan
Councilmember Nancy J Nadel
Mayor Jerry Brown

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1555 Lakeside Drive #167
Oakland, CA 94612-4547
(510) 834-2282

January 16, 2006

City of Oakland
7101 Edgewater Drive
Building #4
Oakland, CA 94621

Attention: Tree Services Section

Tree Services Section Staff:

I moved to Oakland, CA in June 1962 and saw the Australian Tea Trees for the first time which captured my attention and appreciation of their beauty.

These particular tea trees have appeared in many of our photographs over the years and are still special to us.

The 15 trees red tagged along the driveway from 17th street to the former headquarter of the Park and Recreation are all mature and healthy trees.

I was not able to make the lake tour on Saturday, January 7, 2006 but my friend said the explanation for removing the trees is because the equipment used to replace the retaining wall is to large for the space with the trees present.

Please consider removing only every other tree or the ones that cannot be worked around.

Sincerely,

Ronald E. Dudley

Ronald E. Dudley
(510) 834-2282

Enclosures: 4
3 photos
Sunset Garden Book - Page 428

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January 6, 2006

JAN 10 2006

Dan Gallagher, Tree Supervisor
Public Works Agency Administration
City of Oakland
250 Frank H. Ogawa Plaza, Suite 4314
Oakland, CA 94612

Dear Mr. Gallagher,

I am writing you as a concerned citizen and Oakland homeowner. In particular, I am asking you to only remove the trees from Lake Merritt that are certifiably diseased and must be taken out as part of the Measure DD Lake Merritt revitalization project.

The most compelling attraction that kept us in Oakland as we searched for our first home was Lake Merritt. The lake itself can range from extremely grimy to clear and inviting, but the old trees, especially the ones near the boathouse, lend a beauty that never wavers. The shade, history, and grandeur of the trees around the lake create an ecological and aesthetic refuge for both humans and wild animals that cannot be recreated with new saplings. I understand that Measure DD is a positive initiative, and current residents must bite the bullet in some cases to make way for future improvements. But I would hate to see valuable trees removed because they are simply in the way of construction. Might plans be altered to accommodate the existence of some of our historic trees?

Please take a measured approach to the tree removal plan and ONLY remove the trees that must be removed because of disease. Oakland residents value these trees and don't want to see something good created at the expense of something else. Please don't turn our lush lake into a barren park that could be Anywhere, USA. Keep the heritage and character of Lake Merritt intact.

Sincerely,

Laura Nor

Chris and Laura Norlander
612 Jean Street
Oakland, CA 94610
510-268-1606

cc: Councilmember Pat Kernighan

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OSCAR Action CO-8.1.3:

Limit public access within the Emeryville Crescent, Damon Marsh, Arrowhead Marsh, and Fan Marsh.

OSCAR Action CO-9.1.3:

Support a collaborative effort between Oakland, County, state and federal agencies, adjacent cities, the East Bay Regional Park District, and local environmental groups to develop a long-term multi-species habitat conservation plan (HCP) for the East Bay Hills.

Mitigation Measure H.2: None required.

Special Status Species

Impact H.3: Development consistent with the Land Use and Transportation Element could affect the habitat of certain special status plants and result in the loss of special status plant species, and could result in the loss of mature trees on new development sites. This is a less-than-significant impact due to existing policies in the OSCAR Element.

A small number of undeveloped sites in the Oakland Hills contain Alameda Manzanita, Western Leatherwood, Presidio Clarkia, Uncommon Jewelflower, Tiburon Buckwheat, and Oakland Star Tulip. All of these species are identified as rare, endangered, or threatened by the California Native Plant Society. Although they typically occur on land that is publicly owned, some of these plants may be present on private sites designated for Hillside Residential development. Development consistent with the Proposed Land Use Diagram could result in the direct loss of these plants, or the destruction of habitat suitable for their presence. In all cases, these sites were designated for residential development in the prior General Plan.

The loss of large trees could occur in both hill and flatland neighborhoods as development consistent with the Plan takes place. These could include coast live oak, some of which are very old. Although Oakland's tree removal ordinance requires a permit before large trees are removed, and includes more stringent requirements for the removal of coast live oak trees, adverse impacts are still possible. Impacts to trees could either be direct, through tree cutting, or indirect, through construction, grading, or irrigation changes in their vicinity.

As part of the 1996 OSCAR, the City adopted a series of policies associated with biotic resource impacts. These policies, which are identified below, mitigate this impact.

OSCAR Policy CO-7.1:

Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.

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OSCAR Policy CO-6.5:

Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.

OSCAR Policy CO-8.1:

Work with federal, state, and regional agencies on an on-going basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.

OSCAR Action CO-8.1.2:

Work with the Port to establish buffers or mandatory setbacks on the perimeter of wetlands.

Mitigation Measure H.2: None required.

SPECIAL STATUS SPECIES

Impact H.3: Development consistent with the Oakland Estuary Plan could affect the habitat of certain special status plants and animals and result in the loss of special status plant and animal species. This is a less-than-significant impact due to existing policies in the OSCAR Element.

The loss of large trees could occur as development consistent with the Plan takes place. Although Oakland's tree removal ordinance requires a permit before large trees are removed, adverse impacts are still possible. Impacts to trees could either be direct, through tree cutting, or indirect, through construction, grading, or irrigation changes in their vicinity.

As part of the 1996 OSCAR, the City adopted a series of policies associated with biotic resource impacts. These policies, which are identified below, mitigate this impact.

OSCAR Policy CO-7.4:

Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons

Mitigation Measure H.3: None required.

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Lake and Channel. Habitat enhancements outlined in the Project plans would also attract wildlife, create additional roosting and nesting sites along Lake Merritt Channel, and would better facilitate wildlife movement within and between habitats. The Erosion Control Plan and SWPPP, described in Section 4.1.3 of this EIR and required by RWQCB will ensure that water quality is protected throughout the construction period. Overall, the Project is expected to have a beneficial effect on existing riparian or aquatic resources and would not conflict with the City's Creek Protection Ordinance.

Significant Impacts

Impact BIO-1: Impede the use of native wildlife nursery sites.

There are a number of tall trees on the Project site. These trees provide potential nesting habitat for raptors such as red-tailed hawk, red-shouldered hawk, and passerine birds. The Project would remove 31 trees, many of which are fully mature and provide potential nesting habitat for species of raptors and other migratory birds. Raptors (birds of prey) and most passerine birds are protected under the Migratory Bird Treaty Act. To comply with the Migratory Bird Treaty Act, all active nest sites would have to be avoided while birds are nesting.

> **Mitigation Measure BIO-1:** To avoid any nesting season conflict in construction of the 12th Street, 10th Street, or 7th Street Projects, trees shall be removed before the start of the nesting season (February 15). If tree removal is slated for any portion of the nesting season a biologist shall first conduct a nest survey of the area 30 days in advance of start of work. If no nesting is found to be occurring, work can proceed as planned. If nest activity is found, the biologist shall flag off a suitable non-disturbance buffer area that will remain until the young have fledged. Meanwhile, work outside the buffer area can proceed as planned.
>
> **Significance after Mitigation:** Less than Significant.

LETTER B3
Law Offices of Brian Gaffney
Matt McFarland
September 7, 2007

Response B3-1: The City also received comments on the Draft EIR from Nancy Rieser and Ken Pratt, who are identified in this introductory paragraph of the comment letter. Refer to responses to comment letters B14, B15, and B16.

Response B3-2: The Draft EIR fulfills the requirements and purposes of the California Environmental Quality Act ("CEQA") to provide informed public participation and informed decision making. The Draft EIR describes the Measure DD Implementation Project in Section III, Project Description, including the tree removals associated with each project element. The impacts associated with the project are evaluated in Section IV, Setting, Impacts and Mitigation, where mitigation is recommended, as appropriate. Other CEQA-required analyses, for example cumulative impacts, are included in Section V. Thus, the analysis fulfills the requirements of CEQA and the *CEQA Guidelines*. The specific issues raised by the comment in the introductory statements are addressed below as follows:

- Analysis of aesthetic impacts resulting from tree removal (Refer to Responses to Comments B3-3 to B3-9)
- Analysis of wildlife and biological resources impacts resulting from tree removal (Refer to Responses to Comments B3-10 to B3-16)
- Explanation of how proposed mitigations will reduce project impacts to less-than-significant level (Refer to Response to Comment B3-17)
- Analysis of cumulative impacts (Refer to Responses to Comments B3-18 to B3-24
- Impact analysis for tree removal (Refer to Responses to Comments B3-25 to B3-27)

Response B3-3: The comment introduces points made in comments B3-4 through B3-9. The specific points raised in those comments are addressed in the associated responses. Refer also to Master Response M-1.

As discussed in the Draft EIR the removal of trees will not result in significant impacts to scenic views and resources, or the overall visual character of the project site. The Draft EIR's analysis includes among others the impact discussion in Section IV.M, Aesthetics, of the Draft EIR, as well as: 1) visual simulations of the project from key viewpoints that show the visual effects of tree removal/planting (Figures IV.M-1 through IV.M-4 of the Draft EIR); and 2) a Tree Assessment prepared by HortScience, Inc. (included in the Draft EIR as Appendix I), which evaluates the economic/environ-mental costs and benefits of tree removal and

replacement around Lake Merritt, taking into account the aesthetic value of existing and proposed trees. The discussion in Section IV.M, the visual simulations, and the HortScience study lead to the conclusion that tree removal will not result in a significant impact to visual resources.

The analysis in the Draft EIR of the visual effects of tree removal/replacement fulfills the requirements of *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential effects of tree removal provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B3-4: The comment claims that the Draft EIR "fails to explain why the planting of new trees automatically leads to the conclusion that the project will have a less-than-significant impact on a scenic vista." The stated conclusion–that the planting of new trees would reduce impacts to scenic vistas–is incorrect, and misinterprets the analysis in the Draft EIR. Although the removal and planting of trees has much to do with a site's visual character, it will not have a significant adverse effect on scenic vistas (unless new trees would substantially block scenic views). Visual character is the physical appearance or look of a particular location, including the visual cues that provide a sense of place. Elements that affect visual character in urban locations include the location and coverage of trees, street width, building height and mass, pedestrian activity, the type and size of retail establishments, and amount and configuration of open space. A scenic vista is a notable view of a landmark (such as the view of the Golden Gate Bridge from the Berkeley Marina) or a significant landscape feature (such as views of the East Bay Hills from Lake Merritt).

A significant impact to a scenic vista typically involves the construction or installation of a structure that substantially blocks or changes a scenic view. A prototypical example of such a structure is a freeway that obstructs views of a scenic feature such as San Francisco Bay or the East Bay Hills. Although the planting and removal of trees in the project site will change the visual character of the area, it will not block or substantially adversely change scenic views (including views of Lake Merritt, the East Bay Hills, and other important East Bay landmarks). As noted on page 336 of the Draft EIR, the Group 1 project components would "result in small but beneficial improvements to scenic vistas encompassing" Lake Merritt and the Lake Merritt Channel.

Page 336 of the Draft EIR is revised, for clarification. Refer to Master Response M-1 for revisions made to the text.

Response B3-5: The planting of new trees to replace removed trees is not a mitigation measure, but a part of the proposed project (as described or graphically depicted on pages 30, 35,

38, 41, 42, 43, 47, and 49 of Chapter III, Project Description). Further, the plantings of new trees are conditions of the tree permits. Therefore, discussion of the project's impacts and proposed mitigation is not inappropriately combined.

Response B3-6: The impact analysis in the Draft EIR is not limited to a discussion of diseased trees but also addresses impacts associated with the removal of healthy trees. As noted on page 341 of the Draft EIR, "As part of the project, certain trees would be removed (and replaced with healthy individuals). Many of the trees that would be removed are diseased, short-lived, or are not stable." The Draft EIR analyzes impacts associated with the removal of healthy trees, but notes that many of the trees that would be removed are unhealthy or unstable. According to the Tree Assessment prepared by HortScience, over 70 percent of the trees to be removed are dead, or in "poor" or "fair" condition.

Response B3-7: Page 341 of the Draft EIR is revised to further discuss why the removal of trees will have a less-than-significant effect on scenic resources (and visual character). This supplemental text provides additional details about the analysis that was performed to support the conclusions of the Draft EIR, which are unchanged. Refer to Master Response M-1 for text revisions.

The project also includes the rehabilitation of three historic structures around Lake Merritt: the Pergola, Cleveland Cascade, and the Boathouse. This rehabilitation would be undertaken in a way that avoids significant impacts on the historic qualities of the building facades and would enhance these scenic resources. Therefore, this group of project components would have a less-than-significant effect on scenic resources.

Response B3-8: In the case of the Group 1 projects, which would all be located around Lake Merritt and Lake Merritt Channel, impacts to "scenic resources" (the Lake, Channel, and adjacent lands) are essentially the same as impacts to "visual character" (the visual perception of the Lake Channel, and adjacent lands). Refer to Response to Comment B3-7 and Master Response M-1 for an explanation of why the removal of trees from around Lake Merritt and the replacement of these trees with new trees will not result in a significant impact to visual character (or scenic resources).

Response B3-9: The comments submitted by other individuals regarding impacts associated with tree removal are noted. As discussed in Response to Comment B3-7, the removal of trees will have a relatively small visual impact when considered in the context of trees to be preserved within the site and the 521 new trees that will be planted as part of the project. This conclusion is supported by a tree economic/environmental valuation study conducted by HortScience, which determined that within 5 years of planting, the replacement trees will be more valuable in terms of aesthetics and other environmental/economic benefits than the existing trees that will be removed as part of the project. Refer also to Master Response M-1.

Response B3-10: See responses B3-11 through B3-16, which respond to comments raised regarding the Draft EIR's analysis of wildlife and biological resource impacts associated with tree removal. Refer also to Master Response M-1.

Response B3-11: Based on a review of pertinent information (e.g., the California Natural Diversity Database for the area and communications with a local birder) the Draft EIR finds that the only special-status species with potential to nest in the taller trees at Lake Merritt is Cooper's hawk (sharp-shinned hawks are not known to nest in urban areas; they were included in the Draft EIR because suitable nesting habitat is present in the Oakland Hills, where several Measure DD-funded creek restoration projects are proposed). The Draft EIR identifies this *potential* impact at the bottom of page 211. It should be noted that to date, no Cooper's hawks have been observed nesting in any of the trees to be removed. Likewise, no other raptors or owls, including the five species identified by the comment (red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl) have been observed nesting in any of the trees.

For the purposes of the environmental analysis, an impact to Cooper's hawks or other raptor would be considered "significant" if a nest were destroyed during tree removal activities or a pair of raptors abandoned a nest due to human-caused disturbance (e.g., excessive construction noise). As discussed below (Response to Comment B3-16), the City's Conditions of Approval are considered part of the project when determining whether a given impact is significant. The potential impact to nesting Cooper's hawks (and any other birds) would be avoided through the implementation of Condition 32 (i.e., preconstruction surveys and establishment of nest buffers), which has been incorporated as part of the project. Thus, the potential impact is not considered significant.

There are no potential impacts associated with tree removal on Barrow's goldeneye, California brown pelican, double-crested cormorant, American peregrine falcon, or Alameda song sparrow. The trees that will be removed as part of the project, and trees in general, are not an important habitat component for the species as explained in the following paragraphs.

Barrow's goldeneye is a species of diving duck that winters in the Bay Area in small numbers. The species spends all of its time in open water while foraging and resting. Trees are not an important habitat component for this species.

California brown pelicans at Lake Merritt spend nearly all their time resting on or foraging over open water, and are not known to roost in trees. Double-crested cormorants may occasionally roost in trees near the water's edge, but prefer to roost along the shoreline, on docks, or on pilings. None of the trees around the southern end of Lake Merritt represent important roost sites for the lake's cormorant population, which is concentrated more towards the northern end of the lake near the islands adjacent to the Rotary Nature Center. Furthermore, the Species of Special Concern designation for double-crested cormorant only applies to known rookeries, one of which is present at the above-mentioned islands. None

of the trees to be removed support a cormorant rookery.

Trees are not an important habitat component for urban peregrine falcons, which perch almost exclusively on human-made structures (e.g., tall buildings, bridges, transmission towers). Furthermore, peregrines are not a regularly occurring species at Lake Merritt (see Draft EIR page 195). Because peregrines (1) do not perch or nest on trees in urban landscapes and (2) only occur sporadically at Lake Merritt, they will be unaffected by tree removals.

Similarly, Alameda song sparrows do not roost or nest in trees. They are adapted to the open tidal marshes that surround San Francisco Bay, and are thus dependent on low-growing pickleweed and other dense vegetation for nest sites rather than open-branched ornamental trees such as those around Lake Merritt. As such, tree removals will not impact this species.

Response B3-12: The City's Uniformly Applied Development Standard Conditions of Approval are incorporated into projects as explained on pages 64-65 of the Draft EIR and are considered part of the project when determining the significance of a given impact. As such, the City's Conditions of Approval are not mitigation measures. If an impact is less than significant with the Conditions of Approval that are incorporated into the project, no mitigation is proposed. Because the Conditions of Approval are not mitigation measures, consideration of the Conditions of Approval in the impacts analysis of the Draft EIR does not inappropriately combine the analysis of impacts with the discussion of mitigation.

The Draft EIR follows CEQA procedures by analyzing the impacts of the project. Preconstruction surveys for and avoidance of, active nest sites are part of the project and ensure that the impact is less than significant. Thus, no mitigation is proposed.

Response B3-13: Refer to Response to Comment B3-11.

Response B3-14: Potential impacts to the nests of common birds, including red-tailed and red-shouldered hawk, are identified on page 213 (third paragraph) of the Draft EIR. Because preconstruction surveys are incorporated into the project (Condition 32 of the City's Conditions of Approval, included on page 207 of the Draft EIR) the tree removals will not result in significant impacts to nesting birds. The impact would be less than significant with the implementation of Condition 32 because tree removals will occur outside of the breeding season when nesting birds are not present (as was the case for the trees removed in November along Lakeside Drive and Lakeshore Avenue), or if tree removals occur within the breeding season, the trees will be surveyed for nests and if any are found steps will be taken to ensure that the nest(s) are not disturbed until the young have successfully fledged.

Response B3-15: Implementation of Condition 32 from the City's Conditions of Approval (which is incorporated as part of the project) will ensure that tree removals will not violate the Fish and Game Code. The EIR team's ornithologist disagrees with the

comment's assertion that the City should survey the trees for nests of raptors and owls prior to EIR certification. To avoid impacts to nesting raptors and owls, it is essential to survey the trees *at the time of the proposed activity* (i.e., within 15 or 30 days during the breeding season, as per Condition 32) to ensure that no nests are present. Surveying the trees a year or more in advance may provide information as to which trees are being used by raptors and/or owls, if any, but would be of little help in avoiding impacts since most birds vary in their nest placement from year to year. The practice of conducting preconstruction surveys immediately prior to tree removal is a standard avoidance and protection measure that has been implemented on many other similar public works projects, as well as in General Plans, and is regularly accepted by the CDFG as an appropriate mechanism for the protection of nesting raptors, owls, and other native birds.

Response B3-16: Refer to Response to Comment B3-12 for additional information regarding the City's use of its Uniformly Applied Development Standard Conditions of Approval.

The phrase, "to the extent feasible," which is cited in a footnote to comment B3-12, qualifies only a portion of Condition 32 cited by the comment. The relevant section of Condition 32 reads: "To the extent feasible, removal of the trees and other vegetation suitable for nesting or raptors shall not occur during the breeding season of March 15 through August 15. *If tree removal must occur during the breeding season* [emphasis added], all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. …" The measure provides more than one way to reduce adverse effects to nesting birds—either remove trees outside of the nesting season or, survey and avoid active nests if the work must be conducted during the nesting season. As either approach required by Condition 32 avoids adverse effects to nesting birds, no mitigation is required.

Response B3-17: The comment incorrectly states that the EIR determines that compliance with the Tree Preservation and Removal Ordinance will—in and of itself—mitigate potentially significant impacts…" This statement confuses the evaluation of an impact with mitigation. The impact that is being evaluated on pages 218-219 of the Draft EIR is whether the project would fundamentally conflict with the City of Oakland Tree Preservation and Removal Ordinance (see page 210 of the Draft EIR for the complete text of the criterion of significance used to evaluate the impact). For the reasons presented in the first paragraph at the top of page 219, the EIR concludes that the project would not conflict with the ordinance and thus no mitigation is required. Note that other potential impacts associated with tree removal are addressed on pages 211-212, 336, and 341 of the Draft EIR. Refer to Master Response M-1 and Responses to Comments B3-3 to B3-16 for additional discussion of impacts and mitigation associated with tree removal.

Response B3-18: The EIR's analysis of cumulative impacts is adequate. Please see Responses to Comments B3-19 through B3-24. The specific points raised in those comments are addressed there and in the associated responses that follow.

Response B3-19: The Draft EIR first identified the method for estimating the universe of cumulative development (i.e., past, present and probable future projects) and then analyzed that development's potential cumulative impacts.

CEQA allows lead agencies to choose the method for establishing the cumulative projects or projected levels of cumulative development that is best suited to the situation at hand. As the comment notes, the City considered a summary of projections to establish past, present and probable future development. Because the proposed project implements many of the open space, recreation and land use policies described in the City's General Plan and analyzed in previous planning level documents, the City finds the method selected is the one best suited to the situation. The projections account for past and present projects as well as future probable development. In addition, the cumulative analysis considered specific projects, including the Oakland Whole Foods Market, the Jack London Square Redevelopment, and the Oak to Ninth Avenue Projects (page 133 of the Draft EIR).

Having established the cumulative development scenario to be examined for a project of the scale and type proposed here, the City analyzed that development's potential compound impacts. While the comment states that "…'a summary of projections' is not a substitute for an adequate discussion of cumulative impacts", suggesting that the summary of projections is claimed by the EIR to be the equivalent of the analysis of potential cumulative impacts, nowhere does the EIR suggest such a substitution. In fact, following the subsection on Methodology (revised below) the cumulative analysis is conducted over the next three pages (Draft EIR, pp. 363-366) for each of the topics evaluated in the main Setting, Impacts and Mitigation Measures chapter of the Draft EIR. It is in that text – a paragraph or two for each topic – that the cumulative analysis required by CEQA is conducted and presented.

Refer to Response to Comment B3-24 for additional response to the comment on the analysis of cumulative impacts. The text on page 363 of the Draft EIR is revised as follows to clarify the EIR's choice of the summary of projections and approved projects:

1. Methodology

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present and reasonably foreseeable future projects ~~or reasonably anticipated relevant projects~~ (including projects outside the control of the lead agency) or a summary of the projections in an adopted General Plan or related planning document. This cumulative impacts analysis considered development projections that are contained in ~~is likely to occur under the build-out of~~ the various elements of the City of Oakland General Plan, including the Land Use and Transportation Element (LUTE), and the Open Space, Conservation, and Recreation Element (OSCAR), and their related environmental review documentation. The projections account for past and present projects as well as reasonably foreseeable future development. In addition, the cumulative analysis considered specific projects, including the Oakland Whole Foods Market, the Jack London Square Redevelopment, and the Oak to

Ninth Avenue Projects. As a result, the analysis is based on a projections approach, which has been refined by including additional information regarding specific existing and anticipated future projects.

Response B3-20: The cumulative analysis of the Draft EIR included consideration of past, present and probable future projects. Past and present projects are included in the term "build-out" in the context used on page 363 of the Draft EIR and thus were considered in the cumulative impacts analysis. Refer also to Response to Comment B3-19 for revisions to the text to clarify the methodology of the cumulative analysis and to Response to Comment B3-22 for a discussion of the cumulative analysis for aesthetics. The text beginning at the bottom of page 365 of the Draft EIR is revised as follows to clarify the discussions of Public Service and Recreation and Utilities and Infrastructure.

j. Public Services and Recreation. ~~Development of t~~The proposed Measure DD Implementation Project~~, in conjunction with planned future development as anticipated by the City's General Plan~~, would incrementally increase demand for police and fire services as noted in Section IV.K, which finds that the project sites are currently adequately served and the impacts on demand would be less than significant. For recreation, the analysis finds that service is currently inadequate, as the City does not meet its goals of 10 acres of total and 4 acres of urban parkland per 1,000 residents. However, the project would improve recreational facilities and increase the current ratios by constructing new facilities in East Oakland and by increasing the acres of parkland around the south end of Lake Merritt. Thus the project would have a beneficial effect on recreation. Therefore, the cumulative analysis focuses on police and fire services. ~~public facilities and services. However, none of the public facilities or services analyzed would experience significant impacts or create demand beyond that anticipated in the General Plan.~~

There is no evidence that the demand for police and fire services would be cumulatively significant because adequate fire and police service is provided to the project area and development under cumulative conditions would be addressed by the service providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. Build-out of the cumulative projects would not result in cumulative impacts related to physical capacities, service levels or funding availability, particularly because the increased demand for services has, in many cases, been anticipated in planning and policy documents and would be shared across service areas within the City. In addition, given the acceptable levels of service as described in Section IV.K, the demand by the project when combined with past, present, and reasonably foreseeable future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. As a result, no significant cumulative impacts would result.

k. Utilities and Infrastructure. The proposed Measure DD Implementation Project is located in areas already served by utilities and the incremental increase in demand for services would not require the expansion or construction of new facilities. The cumulative increase in demand on the utility providers and infrastructure in the City resulting from implementation of Measure DD, in combination with past, present and other reasonably foreseeable projects in Oakland, is anticipated

within the General Plan as well as within plans prepared by each of the utility providers to address projected growth.

There is no evidence that the demand for utilities and infrastructure would be cumulatively significant because adequate service is provided to the project area and development under cumulative conditions would be addressed by the utility providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. In addition, given the acceptable levels of service as described in Section IV.L, the demand by the project when combined with past, present and reasonably future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. Therefore, no significant cumulative impacts would result.

Response B3-21: The cumulative impacts discussion focuses on effects that could cause cumulatively considerable impacts when combined with the effects of past, present, and probable future projects. The analyses are not site-specific but encompass a geographic area appropriate to the area of potential cumulative effect, such as the air basin for air quality but appropriately smaller areas for other topical areas, such as noise, geology and hazards. Refer to Response to Comment B3-23 for revisions to the Hazards and Hazardous Materials analysis. Refer to the end of Chapter IV of this Response to Comments document for additional revisions to the cumulative impacts analysis in Section IV.C, Transportation, Circulation, and Parking, of the Draft EIR. The cumulative analyses for Transportation, Circulation, and Parking, Air Quality, Noise, and Geology, Soils and Seismicity found on pages 363-365 of the Draft EIR are revised as follows:

b. Transportation, Circulation and Parking. A detailed analysis was conducted for the purposes of assessing cumulative environmental impacts to the transportation system as described in Section IV.C. As described therein (see pages 133 to 134), the cumulative analysis analyzed the project in combination with past, present and reasonably foreseeable future projects. The cumulative analysis identified five significant cumulative impacts related to transportation (TRAF-5 through TRAF-9), three of which are identified as significant and unavoidable because they may not be reduced to less-than-significant levels. The impacts and mitigation are discussed in detail in Section IV.C. No significant impacts were identified for alternative modes of transportation. The project would not fundamentally conflict with adopted policies, plans, or programs supporting pedestrian and bicycle transportation or transit use. The project would improve both pedestrian mobility and bicycle transportation. Although travel times would increase as a result of the project and affect some transit routes, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Thus, the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impact.

c. Air Quality. As noted in the air quality impact analysis in Section IV.D, the air basin within which the City of Oakland and the project components lie is non-attainment for ozone, PM_{10} and $PM_{2.5}$. As such, the project and other past, present and reasonably foreseeable future projects could

result in an impact that is cumulatively significant for air quality related to these pollutants. However, the City finds that the project's contribution to the impact would not be cumulatively considerable and thus the impact is less than significant. According to the *Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines*, any proposed project that would individually have a less-than-significant air quality impact and is consistent with the General Plan, where the General Plan is consistent with the Clean Air Plan, would be considered to have a less-than-significant cumulative air quality impact. The Measure DD components would not have significant operational air quality impacts, therefore a determination of the cumulative impacts would be based on an evaluation of the consistency of the project with the City of Oakland's General Plan and of the General Plan with the regional air quality plan. As discussed in Section IV.D, tThe City of Oakland's General Plan is consistent with the 2005 Ozone Attainment Plan, the fourth triennial update of the Clean Air Plan, and the project is consistent with the General Plan;. In addition, the project would not generate objectionable odors, expose sensitive receptors to substantial air pollutant concentrations, or emit toxics that would contribute to a cumulative impact. Likewise, the project would not contribute to an impact associated with CO concentrations because CO concentrations would not increase as a result of the project. Ttherefore the project would not have a significant cumulative impact.

d. Noise. As noted in the noise analysis in Section IV.E, tThe project components are primarily recreational facilities and water quality improvements that would not produce substantial noise during their operation and would not contribute substantially to the cumulative noise environment, which would generally include the project site and surrounding properties. Further, the noise impact analysis in Section IV.E notes that the primary source of noise in the project area is and would be motor vehicle noise. The analysis of cCumulative traffic noise impacts for all project components, as shown in Tables IV.E-12 and IV.E-13 and in the discussion under Section IV.E.2.b, was based on the cumulative traffic volumes (i.e., cumulative plus project scenario) generated for the traffic analysis in Section IV.C, which included the project and other past, present, and reasonably foreseeable future ~~planned~~ projects within the City of Oakland. The analysis demonstrates that the cumulative noise impacts from traffic would be less than significant for noise sensitive receptors within the City of Oakland.

There would be temporary construction noise impacts and one of these (i.e., pile driving) ~~that~~ would be significant if noise-reducing measures specified in the City's ~~Standard and~~ Uniformly Applied Development Standard Conditions of Approval are not feasible (as noted in Section IV.E). ~~However~~If they occur, these impacts would be limited to sites around Lake Merritt, namely the E. 18th Street Pier, the 12th Street reconstruction area and Lake Merritt Channel, and a few segments of the Waterfront Trail ~~site-specific~~ and limited to the duration of construction period. Except as noted with respect to pile driving, there is no evidence that noise levels would be cumulatively significant. The noise levels in the project area are within the City's standards for noise and because construction projects in the cumulative scenario within the City of Oakland are required to comply with the City's Noise Ordinance and Conditions of Approval. ~~Thus,~~ The requirements will render cumulative construction noise and operational noise impacts ~~would be~~ less than significant.

h. Geology, Soils and Seismicity. The area of cumulative effects for geology, soils and seismicity issues, such as liquefaction, landslides, lateral spreading, expansive soils, landfills, and septic systems, is the project site. ~~The geologic, seismicity, and soils conditions of this site are specific to the individual component sites. Other sites in the vicinity may have similar issues and concerns regarding geological conditions and hazards.~~ For geologic, seismicity, and soils issues, the proposed

development does not influence or degrade conditions in the area of cumulative effects, because among other reasons, ~~as long as~~ the impacts of the individual components are reduced to a less than significant level by the California Building Standards Code and the City's Uniformly Applied Development Standard Conditions of Approval with which the project will be required to comply. In addition, many features of the project, such as improvements to trails, creeks, landscaping, and water quality, do not create any hazards. Others, such as renovations of the Studio One Art Center, the Municipal Boathouse and the Pergola, would reduce existing hazards by strengthening existing structures. These actions would not contribute to a cumulative impact and, in the case of renovations would have net beneficial effects. New structures associated with past, present and reasonably foreseeable future projects as well as the current project, such as the East Oakland Sports Complex, would be built to current seismic codes ensuring that potential seismic hazards are less than significant. Thus, the project would not make a cumulatively considerable contribution to a cumulative significant impact related to geology, soils or seismicity.

Response B3-22: The cumulative analysis for aesthetic resources in the Draft EIR is consistent with CEQA and the *CEQA Guidelines*. The analysis considers both whether there is a significant impact to which both the proposed project and other projects contribute and whether the project's incremental contribution is cumulatively considerable. *CEQA Guidelines* Section 15130(a) states that: "An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant." The project's contribution to the cumulative aesthetic impact of past, present and probable future projects is clearly less than significant in light of the City's finding of the project's many benefits on visual resources. As discussed on page 366 of the Draft EIR, the proposed project would have beneficial effects on the visual quality of Oakland by renovating open space around Lake Merritt, restoring historic landmarks, improving water quality, constructing trails in shoreline areas, and restoring creeks. Therefore, the project's contribution to adverse impacts to visual resources associated with the implementation of other projects in Oakland is less than cumulatively considerable and thus not significant.

Response B3-23: The Draft EIR does not rely on mitigation of future projects to "eliminate potential cumulative impacts." The analysis considers both whether there is a significant impact to which both the proposed project and other projects contribute and whether the project's incremental contribution is cumulatively considerable. Further, for Biological Resources, Hydrology and Water Quality, and Hazards and Hazardous Materials, which are cited in the comment, the project would not have significant cumulative effects because generally the project's effects are beneficial. Indeed, it is among the project's objectives to improve water quality and habitat for fish and wildlife (page 24 of the Draft EIR).

For Hydrology and Water Quality, the Draft EIR finds that the project would reduce flooding, improve water infiltration and groundwater recharge, and improve water quality. In addition, the project includes measures to protect water quality during construction and project operation as described in Section IV.H.2.b of the Draft EIR. Nevertheless, as noted on page 260 of the Draft EIR, Lake Merritt is an impaired water body due to organic enrichment, low dissolved oxygen, and trash

and the Estuary and San Francisco Bay, to which Oakland's creeks flow, are impaired for pesticides, dioxins, furans, PCBs, selenium, mercury, and exotic species. Thus, the contribution of the project and other past, present and probable future projects could result in an impact that is cumulatively significant for water quality. However, the project's contribution to the impact would not be cumulatively considerable for two reasons: 1) with the exception of organic nutrients, the project would not generate the contaminants for which the water bodies are impaired and 2) the project would likely reduce organic nutrients due to the net decrease in impervious surface around Lake Merritt and the Best Management Practices (BMPs) that are included in the project (e.g., grassy swales, porous pavements, and stormwater planters). Thus, the cumulative impact of the project is less than significant, as stated in the Draft EIR. The text on page 365 of the Draft EIR is revised to clarify the explanation of the cumulative impacts analysis as follows:

g. Hydrology and Water Quality. The majority of Measure DD components would be constructed in an urbanized area of Oakland and would not significantly increase impervious surface coverage or result in flood hazards within the component sites. In fact, several Measure DD Project components would include measures to improve water quality.

Construction and operational-period impacts to stormwater that would result from implementation of the Measure DD Project would be minimized through compliance with the Water Board's regulations and implementation of the City's Standard Conditions of Approval. Nevertheless, as noted on page 260 of the Draft EIR, Lake Merritt is an impaired water body due to organic enrichment, low dissolved oxygen, and trash and the Estuary and San Francisco Bay, to which Oakland's creeks flow, are impaired for pesticides, dioxins, furans, PCBs, selenium, mercury, and exotic species. However, the EIR analysis shows that the project's contribution to the impact would not be cumulatively considerable for two reasons: 1) the project would not generate the chemical contaminants for which the water bodies are impaired and 2) the project would likely reduce organic nutrients due to the net decrease in impervious surface around Lake Merritt and the Best Management Practices (BMPs) that are included in the project (e.g., grassy swales, porous pavements, and stormwater planters). Thus, the cumulative impact of the project is less than significant. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same water quality maintenance measures and would not result in cumulative adverse impacts to water quality. Therefore, implementation of the proposed project would not result in significant cumulative hydrology and water quality impacts.~~

For Hazards and Hazardous Materials, the Draft EIR finds that the East Oakland Sports Complex would store a hazardous material, sodium hypochlorite (i.e., bleach); that commonly used hazardous materials, such as paint, fuels and adhesives, would be transported and used during project construction; and that the reconstruction of 12th Street would temporarily close a designated emergency evacuation route. None of these would result in a significant cumulative impact when the project is considered with past, present and probable future projects as explained below.

Hazardous materials transport, storage and use would be cumulatively significant if the project and cumulative projects created a significant hazard to the public or the environment within the area of cumulative effect (i.e., the project construction sites, the East Oakland Sports Complex site, or roadways to these sites). The cumulative effect would create a significant hazard to the public if the hazardous materials in the cumulative scenario exceeded regulated quantities or resulted in the improper use or storage of hazardous materials. The storage of common hazardous materials in accordance with State and federal regulations and the City's Best Management Practices by the project in combination with past, present, and probable future projects would not create a significant cumulative hazard to the public or the environment. Thus, the cumulative impact would be less than significant.

For emergency evacuation routes, the area of impact would be the areas served by 12th Street, the evacuation route that would be temporarily closed during construction. During the period of project construction, other projects in the cumulative scenario could have street closures that would affect the same areas, which could constitute a cumulative impact. However, the proposed mitigation requires the review and approval of the temporary detour plans by the City's Office of Emergency Services, which would be aware of all closures in the City, and would ensure that the project's contribution is less than cumulatively considerable because it requires that alternative routes are identified and available during project construction. Because the project's contribution to the cumulative impact is not cumulatively considerable the impact is less than significant. The text on page 365 of the Draft EIR is revised to clarify the explanation of the cumulative impacts analysis as follows:

i. Hazards and Hazardous Materials. The hazards and hazardous materials issues for the proposed project are specific to the individual component sites and would not lead to any cumulative impacts related to hazards. Most components of Measure DD would not store or use substantial quantities of hazardous materials and would, at some sites, help ensure that potential chemical hazards in soil or groundwater are remediated and the risk from these hazards is reduced. ~~Some hazardous materials would be stored for maintenance and disinfection purposes at the proposed East Oakland Sport Complex. As all such storage and use in the City of Oakland must comply with State and local regulations for hazardous materials, this would not have a significant cumulative impact.~~

Hazardous materials transport, storage and use would be cumulatively significant if the project and cumulative projects created a significant hazard to the public or the environment within the area of cumulative effect (i.e., the project construction sites, the East Oakland Sports Complex site, or roadways to these sites). The cumulative effect would create a significant hazard to the public if the hazardous materials in the cumulative scenario exceeded regulated quantities or resulted in the improper use or storage of hazardous materials. The City finds that storage of common hazardous materials in accordance with State and federal regulations and the City's Best Management Practices by the project in combination with past, present, and reasonably foreseeable future projects would not create a significant cumulative hazard to the public or the environment. Thus, the impact would be less than significant.

For emergency evacuation routes, the area of impact would be the areas served by 12th Street, the evacuation route that would be temporarily closed during construction. During the period of project construction, other projects in the cumulative scenario could have street closures that would affect the same areas, which could constitute a cumulative impact. However, the proposed mitigation requires the review and approval of the temporary detour plans by the City's Office of Emergency Services, which would be aware of other closures in the City, and would ensure that the project's contribution is less than cumulatively considerable because it requires that alternative routes are identified and available during project construction. Because the project's contribution to the cumulative impact is not cumulatively considerable the impact is less than significant.

For Biological Resources the project's contribution to the cumulative impact of past, present and probable future projects is less than significant in light of the finding of the project's many benefits to wildlife, habitat quality, and water quality. As discussed on page 364 of the Draft EIR, the proposed project would have beneficial effects on the biological resources of Oakland by increasing open space and improving water quality. Other benefits are identified in the project description and therefore, the project's contribution to adverse impacts to biological resources associated with the implementation of other projects in Oakland is less than cumulatively considerable and thus less than significant. The text of the Biological Resources section on page 364 of the Draft EIR is revised as follows to clarify the explanation of the cumulative impacts analysis:

e. Biological Resources. Project activities are not anticipated to make a cumulatively considerable contribution to ~~have~~ a cumulative significant impact on biological resources. The project would generally be conducted in an urbanized area and would increase open space and improve water quality, which would benefit wildlife. Other benefits include establishing foraging and refuge areas by restoring native vegetation, restoring wetlands, and removing exotic invasive vegetation, providing greater diversity of habitat, and improving connectivity between Lake Merritt and similar habitat areas within the area. Potential temporary impacts to wildlife, such as nesting raptors and songbirds~~,~~ during construction, injury to fish during pile driving, or disturbance of wildlife in the Channel by small boats, and impacts to waters of the U.S. and State ~~of some project components were identified, but these would be mitigated~~ would be avoided (impacts to wildlife and fish) or fully compensated for (impacts to waters of the U.S. and State) by the City's Conditions of Approval or by the mitigation measures recommended in this EIR. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same protective measures for biological resources and would not result in cumulative adverse impacts to wildlife. With implementation of the mitigation measures~~Because the potential impacts to biological resources would be beneficial, avoided, or fully compensated for, the project's incremental contribution would not be cumulatively considerable and the impact would be less than significant.~~fully mitigated and no cumulative effects to biological resources would result from this project~~.

Refer to Response to Comment B3-19 for additional discussion of cumulative projects used in the analysis.

Response B3-24: The EIR provides analysis as well as conclusions in the discussion of cumulative impacts. The example provided in the comment for Land Use cites the conclusion of the impact analysis but excludes the preceding text that provides the analysis and

rationale for the conclusion. As stated in the cumulative impact analysis for Land Use, the proposed land uses associated with the project are compatible with surrounding land use. They are also compatible with uses proposed in the General Plan. The only potential land use conflict (and significant impact) is a site-specific safety issue associated with one property along the Waterfront Trail. This would not have a cumulative impact when considered with past, present, and future probable projects. To clarify the City's basis for its findings page 363 of the Draft EIR is revised as follows:

a. Land Use. The majority of the Measure DD components would renovate or improve existing structures, recreational facilities, roadways, and creeks within the City of Oakland and would not change land use. New land uses would include roadway and park changes associated with Lake Merritt~~,~~ and the creation of new parks and installation of the new trail connections associated with the Waterfront Trail~~, and the construction of the East Oakland Sports Complex.~~ With one exception, t~~T~~he proposed land uses associated with the project would be compatible with the ~~surrounding~~ land use and zoning of the project site and surrounding neighborhood, which is the geographic area of potential cumulative effect for land use impacts. ~~One~~ The potential land use conflict, a potential safety hazard that would be created by constructing the trail across an operating industrial facility, was identified for the Waterfront Trail group. ~~, which~~ This impact would be reduced to a less-than-significant level with implementation of the identified mitigation measure. The EIR analysis shows that the impact would not be cumulatively considerable for two reasons: 1) there are no other similar safety impacts to which the impact would contribute and 2) the residual effect would be eliminated by the proposed mitigation measure. Thus, the project ~~This site-specific impact~~ would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts.

Analysis is provided on pages 363-364 of the Draft EIR for the other topical areas cited in the comment. The Transportation, Circulation, and Parking section, for example, includes a detailed analysis of cumulative impacts (Section IV.C), which is cross-referenced in Chapter VI. Refer also to Responses to Comments B3-20 (Public Services and Utilities and Utilities and Infrastructure), B3-21 (Transportation, Circulation, and Parking), and B3-23 (Biological Resources and Hydrology and Water Quality).

Response B3-25: The comment claims that there is substantial evidence that tree removal would have a significant effect on the environment. In the case of the Measure DD Projects, recognizing a divergence of public opinion on this matter, the City determined that tree removal associated with the project could result in significant impacts to visual resources. Therefore, the City decided that this issue (among others) would be addressed in an EIR. Subsequent to the publication of the Draft EIR the Alameda County Superior Court confirmed the City's prior analysis of no significant impacts (see Master Response M-1). Moreover, as discussed in the Draft EIR and in Response to Comment B3-7, tree removal will not result in a significant aesthetic impact. The evidence supporting the conclusion in the Draft EIR that tree removal will not result in a significant impact on aesthetic resources includes the following items:

- Many of the trees that would be removed are diseased, short-lived, or are not stable (i.e., they are dead, or in poor to fair condition), and detract from the visual environment of Lake Merritt and Lake Merritt Channel;
- Approximately 510 trees would be retained within the project area.
- Trees would be planted as part of the project (521 in total, creating a replacement ratio of almost two trees for every removed tree) and these new trees would enhance the visual character of the site;
- Visual simulations prepared for the project (refer to Figures IV.M-1 through IV.M-4 in the Draft EIR) show that tree removal would have a less-than-significant impact on visual character and scenic resources; and
- A tree economic/environmental valuation study conducted by HortScience determined that within 5 years of planting, the replacement trees would be more valuable in terms of aesthetics and other environmental/economic benefits than the existing trees that would be removed as part of the project.

The claim that tree removal will result in significant effects to the visual quality of Lake Merritt and its surroundings fails to give due consideration to both short-term and long-term environmental impacts as mandated by *CEQA Guidelines* Section 15126.2. As shown in the HortScience tree valuation study in Appendix I of the Draft EIR and the visual simulations, the project would result in positive aesthetic, environmental, and economic effects in the long-term. Refer also to Master Response M-1.

Response B3-26: The policy cited in the comment discourages (but does not prohibit) the removal of large trees. The project would preserve many more existing large trees than will be removed, replacing each removed tree with approximately two new trees. The flexibility of the policy cited by the comment (indicated by the word "discourage") suggests that the policy be interpreted in the context of other, competing General Plan policies, including Policy OS-6.4, which directs that Oakland's lakes be managed to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. The project would accomplish these objectives and it is consistent with the City's General Plan policies for improving recreation and open space areas and creating new recreational opportunities for residents of Oakland. In the context of other, competing General Plan policies, the project would not directly conflict with the policy referenced in the comment and the impact would be less than significant.

Refer to Response to Comment A1-14 for additional discussion of conformance with the City's General Plan.

Response B3-27: See Response to Comment B3-11 for a discussion of potential impacts of tree removals on individual species of birds.

The analysis and conclusions of this EIR are consistent with the Lake Merritt Channel Wetlands and Widening Project EIR. The Lake Merritt Channel Wetlands

and Widening Project *did not include* preconstruction surveys or other requirements to avoid impacts to active nests that are found. Thus, the Lake Merritt Channel Wetlands and Widening Project EIR identified the impact on nesting raptors and other migratory birds as significant and prescribed preconstruction surveys and nest buffers as mitigation to avoid or reduce the impact to a level that is less than significant. The Measure DD Implementation Project *includes* preconstruction surveys and nest buffers as part of the project. Thus, impacts to nesting raptors and other birds will be avoided and were found to be less-than-significant in the Draft EIR. The surveys and buffers that reduced the impact to less than significant for the Lake Merritt Channel Wetlands and Widening Project (via mitigation) have been incorporated into the Lake Merritt Implementation Project. After the surveys are conducted and the nest buffers are implemented, as needed, the outcome with regards to the level of significance is the same for both projects; the impact would be less than significant.

Letter
B12

Fax - 8 pages

Dear Elois

The attached is a revised version of what I sent last nite. I started to correct some errors and then got carried away. It is requested that you replace yesterday's version with this one, However, if you can't because admittedly it is late, I understand. I will then submit it later when the issue goes back to the Planning Commission. 1

Thanks again for all of your help

David E. Mix

Letter
B12
cont.

September 11, 2007

Ms. Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Plaza, Suite 3315
Oakland, C A 94612

Re: City of Oakland Measure DD Implementation Project
Environmental Impact Report - Public Review Draft, (DEIR)

Dear Ms Thornton:

Please consider the following comments regarding the above captioned matter.

The DEIR is sorely inadequate. It fails to identify many Environmental Impacts or adverse effects the project will have on the environment and where it does identify an impact it is arbitrarily treated as "less than significant" or claimed to be mediated by an insufficient or inadequate solution.

The Environmental evaluations made by LSA are, in most part, based on inferior and inaccurate reports produced through incomplete and shoddy investigations resulting in misleading and totally false conclusions.

In other areas the detrimental impacts produced by the project are merely ignored or arbitrarily and capriciously rated as *less than significant.*

There are nine primary subjects of vital concern but, by no means are my comments to be considered limited to those particular subjects and my contention that the DEIR is inadequate and fails to identify significant environmental impacts, necessarily covers any and all of the Measure DD projects.

LAKE MERRITT AREA - CHANNEL AREA - EMBARCADERO

1) Hydrology of the Lake and the Channel

2) Flooding of Lake Merritt area, Channel area and Embarcadero area (Oak to Ninth, etc.)

3) Contaminated soils, channel area, and elswhere.

4) Traffic congestion and subsequent pollution.

5) Unnecessary removal of trees, lake area, channel area and especially the Auditorium parking lot, but certainly not limited thereto.

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B12
cont.

6) Public safety - Multi-use paths - elimination of traffic "pork chops", endangering pedestrians and bicyclist.

7) Engineered degradation of open space parkland (Boathouse/Restaurant parking lot).

8) Depriving the public access to public spaces (Boathouse/Restaurant).

9) Elimination of public restrooms in vital and needed locations.

LAKE MERRITT

Lake Merritt has been a subject of controversy for more than a hundred and fifty years. When Doctor Samuel Merritt, then Mayor of Oakland, damed San Antonio Slough (said to be with a lot of his own money) in 1869 to form a lake he was a large property owner of parcels on the North side. It was rumored to be more of real estate speculation in creating lake front property (and to eliminate the smelly slough) rather than for a civic purpose.

In 1870 when the Governor signed the bill creating Lake Merritt as the first wildlife refuge and waterfowl sanctuary in North America, the real intent may have been to protect human life from hunters who often used the area for hunting, not to mention the noise impact of gun fire on potential property sales.

JUNK SCIENCE

The tidal flows of Lake Merritt and its varied elevations are controlled by gravitational forces and the flood gates and pumps at the 7th street crossing, owned and operated by the County of Alameda, (Flood Control and Water Conservation District).

In June 2002 URS published a Feasibility Study and Greenbelt Plan, for the Lake Merritt Channel (commissioned by the Port of Oakland). The study covered four alternatives in modifying the channel and removal or relocation of utilities within the channel to improve water flow and tidal flushing action. In June 2004 URS prepared an addendum to their 2002 Greenbelt study.

The 2002 Greenbelt plan in its hydraulic analysis references HEC-RAS River Analysis System software, Version 3.0.1 (March 2001) a one-dimensional hydrodynamic model developed by the U.S. Army Corps of Engineers. Material produced later by PWA (Phillip Williams and Associates) in several reports references a MIKE 11 model and as modified by PWA.

There is no clarification in any of the reports indicating

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cont.

what MIKE 11 is and there is no indication in the URS 2002 report referencing a MIKE 11 model. This of course begs the questions. What is it? Who created it? And, precisely what information was used in its creation - How can we check the results if the whole thing is treated like a secret. In other words, show us the numbers.

Understanding that a tidal flow model must consider all restrictions in the channel including culverts and pipes, etc. and foremost, the County Flood Control Station, the exact dimensions of those openings is of vital importance.

Additionally, the exact elevation of the devise is critical to a projected flow. Unless the devise remains completely submerged at all times, including median low low tides, the full geometric dimension is not utilized.

The PWA Report of October 04 (and others) shows the flow area in square feet of the various culverts and channel restrictions. The culverts at 12th and 10th streest are shown at 260 sq. ft. However, the dimensions are, 8, 6x6 cells. 6x6=36 times 8=288, and not 260. The Flood Gates at 7th street are shown at a dimension of 12x17 for the box culverts which equals 204 times (2) culverts for a total of 408 and not 554 at listed in the PWA report.

More critical to the flow however, as noted above, is the elevation of the culverts, As an extreme example, if the elevation of a given culvert were completely above the given flow line (elevation) the flow would be negligible or nonexistent. Likewise, if the culvert were located at an elevation midway of the flow line then only half of the culvert's sq. ft. area would be utilized.

Additionally, the Oakland Inner Harbor has an average tidal range of 6.38 feet, while the Lake has a tidal range of about two feet. In either area, Inner Harbor or the Lake, the elevation of a culvert is critical to the flow. If a culvert's top is at the high tide elevation then the dimensional water flow through the culvert will gradually decrease as the water level drops. As is the case at the Lake opening to the channel, the Lake tidal range is no more that two feet, as the water drops, the flow decreases from the maximum of two feet to zero.

At the pump station, the elevation of the bottom of the culverts is -8.27 ft. (NAVD88) while the rock and dirt guard is at -0.93, and the top of the BART Tunnel is at -0.30. Although the total height of the culvert is 17 ft. the high tide line is at approx. 5.4 (at that location) which leaves only 13.3 feet of the culvert height being utilized. This calculates to 320 sq. ft. (13.3x12=160 times two) of water flow and not 554 sq. ft. as shown by PWA.

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cont.

As the water drops to the low tide line of 3.4 feet, only 11.7 of the culvert height is utilized, which results in only 140.4 sq.ft. of water flow (times two, equals 280.8 - less than the 288 sq. ft.at 12th and 10th streets). That flow however, is negatively impacted by the depth of these culverts which lie 7.4 feet below the elevation of the EBMUD 84" sewer interceptor (El. -0.87') at the mouth of the channel at the Embarcadero Bridge, just below the 54" EBMUD sewer line and the 24' high pressure gas line and where it extends five feet above the channel bottom, acts as a weir restricting flows and at very low tides creates an actual waterfall, clearly visible from the Embarcadero Bridge.

Subsequently, the area between the EBMUD 84" interceptor (El -0.87) and the lowest point of the flood control box culverts (El -8.27) act as a huge channel invert and either restrict flows or are not negligible in making flow calculations. In other words, once the water level drops to the height of the 84" sewer interceptor (-0.87 feet) the lower portion of the 7th street flood gate box culverts (7.4 feet) is then below the flow line and becomes static. At that point the active geometric dimensions of the flood culverts would be zero. As the water rises it would increase from zero to the high tide level at that location of approximately 6.45 feet, producing just under 100 sq. ft. of active geometric flow area, times two culverts, equals less than 200 sq. ft. Please note however, the various tide levels (High and low) at particular locations along the channel are the results of "Hydraulic Modeling" and not actual field measurements, subsequently, they are highly suspect There is nothing provided in the various engineering reports indicating how these issues are treated.

Understanding that the EBMUD 84" interceptor pipe at the mouth of the channel is the greatest impediment to channel flows, it is bewildering why it hasn't been addressed in this project. Additionally. the BART Tunnel which lies a mere -0.30 in depth just above the 7th street Flood Gates, also has not been addressed. The depth at the lake opening could be increased (dredged) from its present 1.58 feet to match BART's depth at 0.30 and the channel widened to 100 feet and open bridges erected at 12th and 10th streets but it still will not make an appreciable difference in tidal flushing action where the average depth of the lake is approximately -3½ feet, more than three feet lower than the BART Tunnel.

FLOODING

At the other end of the spectrum is flooding. The URS Report clearly points out that "extreme tides" are not necessarily that extreme. The higher high elevation for the model used reaches approximately 8.0 feet while the lower low elevation is approximately -0.7 feet. (Note!, all elevations are North American Vertical Datum of 1988, (NAVD88)). From tidal data records from

Letter
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cont.

January 1996 through May 2002, a higher high tide elevation of 8.0 feet has been reached 17 times.

Under the URS scenario (2002) of alternative No. 3, where both 12th and 10th streets are open with an arch bridge, the 84" sewer interceptor is removed, the channel is widened at the mouth with a new Embarcadero Brideg and the 7th street flood control struc-ture is relocated to the Lake, flooding becomes very likely under existing conditions. Lake tidal elevations would range from a low of 3.6 feet to a high of 6.9 feet and with a tidal range of 3.3 Feet.

Durin existing conditions potential flooding may occurat the Municipal Boathouse main deck and storage room, the Sailboat House and Boat Rental Office, the lower and upper ends of Lakeshore Avenue and the intersection at the veterans memorial Building, Grand and Harrison. And an extreme tidal cycle could push the range to as high as 5.3 and most certainly cause sig-nificant flooding in the above areas and far beyond.

It is quite simple, the County flood control station at the 7th street crossing was built in 1968, following the devastating flood of October 13, 1662. It was engineered and designed to protect against adverse weather and alleviate the potential for catastrophic flooding through a sophisticated arrangement of diesel pumps and automatic flood gates.

According to Alameda County documents (Brown and Caldwell, Consulting Engineers) 1966 Flood Control Facilities Study, the pump station may also be used for flushing operations. It is estimated that an average of about 15 pump-hours is used for each lake flushing operation and about 150 pump-hours per year is needed for flushing.

According to the County, starting with a lake water surface elevation of 5.2 (NAVD) (original 2.5 SLD29) feet it is possible to withdraw and back-fill 2.0 feet of water (320 acre-feet) within 12 hours elapsed time. Flushing volume can be increased by extending the time allowed for the flushing operation. Also, the volume of degraded water removed from Lake Merritt can be increased by raising the lake level prior to flushing. For example, operation of the pumps in the backfilling mode for about 2½ hours prior to flushing would raise the lake one foot. In the following 12 hours the lake could then be lowered three feet (480 acre-feet) and raised two feet to restore it to the normal operating level. (see Coiunty Report, page 35)

In other words, the County is capable of establishing the Lake at any level, at any time, or on any giving day the City may desire, Or, to completely and totally flush the lake, every day, once a week, once a month, or as seldom or as often as the City may desire. The contention that the pumps only operate 1% of the time is, if at all true, by the City's choice.

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B12
cont.

None of the above potential flooding issues or preventive measures are addressed in the DEIR - it is totally lacking.

CONTAMINATED SOILS

The DEIR readly admits that it doesn't address possible contaminated soils, especially in the channel area. The investigation falls far short in that there has been no soil samples taken regarding fill or a review of past activities at the various locations which may have contaminated the soil. As known to many Oaklanders the site was the Exposition Building and Oakland's race Way Dirt Track for Auto Racing, and some claim a gas station, among other things.

POLUTION OF THE LAKE

The DEIR does not address the tons of pollution, commonly referred to as industrial fall out, washing into the lake through the 42 plus, storm sewer inlets. It does not address how the lack of spending the money designated for these improvements is harming the environment. One need only observe the build-up of filth on the bright orange barricades at the South end of the lake to see that we have a major problem - that filth is washing into our waterways and we are breathing it daily.

MARSH LAND and WIND/WAVE ANALYSIS

The creation of the proposed marsh lands or tidal basin has not been adequately addressed in the DEIR. A creation of a marsh habitat is difficult at best and the vegetation does not survive at the low tide levels creating a smelly and unsightly "mud flat" below the anticipated marsh grasses. The colonization of cordgrass is assumed to be 4.5 (NAVD) MTL while the elevation for tidal wetland vegetation growth is assumed to be 6.2 (NAVD) (HHHW). In simple terms, there is a natural span, depending on the degree of slope, at low tide (where nothing grows) and the vegitation - the "mud flat" area. The aesthetics and other issues regarding the potential mud flats has not been addressed by the DEIR.

The wind at the South end of the lake and along the channel at times can be horrific. The reconfiguration of the roadways, widening of the channel, Construction of arch bridges, cutting of trees and other vegetation, will without question have an impact on the environment, the wave run up, etc. This has not been adequately addressed in the DEIR .

Water quality, wind, flooding, tree removal, traffic congestion creating excess pollution and dangerous multi-use paths (bicycle running into a baby carriage, etc.) are just some

Letter
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cont.

of the issues which have not been adequately addressed in the DEIR.

As part of my comments I ask that other documents be reviewed and considered to be incorporated therein:

1) Lake Merritt Master Plan;

2) Port of Oakland Lake Merritt Greenbelt Feasibility Study (June 2002);

3) Thesis by Mary A. Travis, "A Historical and Environmental Geographic Analysis of Lake Merritt (1995);

4) Alameda County Preliminary Design Study, Lake Merritt Flood Control Facilities (1966).

Respectfully submitted

David E. Mix

LETTER B12
David E. Mix
September 11, 2007

Response B12-1: Although the comment states that the attached letter is a revised version of one that was sent previously (namely, letter B11), the text appears to be identical. Refer to Responses to Comments B11-1 to B11-15.

Letter
B13

RECEIVED
SEP 11 2007
City of Oakland
Planning & Zoning Division

September 10, 2007

Eloise Thornton, Planner IV
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

If the size of the DEIR were equivalent to its quality, I would give it an A+. Instead it showed a lack of planning with city traffic agencies, state and federal agencies, and even Our Lady of Lourdes Church (nearby), in letters dated 2006-7. **1**

In Appendix C, some letters appeared more than once, but I didn't find the letters that I wrote requesting information through Open Government regarding the amount of liability the city had paid out for the last ten years which was less than $15,000, nor my request for the phone log that Public Works was to have kept indicating the number calls made to them for saving the trees. (Many people complained to me that the line was busy. When they called later the answering machine was full.) The letters sent me, from this request, were overwhelmingly against the city plan. **2**

I have lived in Oakland since 1979 and across from the lake since 1980. One reason for buying here was because of the lake's beauty visible from my living room and bedroom. I used to walk the lake at lunch when I worked at PG&E in Oakland, but now with MS I only walk part way. Still I enjoy its beauty from our terrace and garden. Cutting 259 mature trees will take away this beauty and its aesthetic charm. Neither I nor other tax paying citizens and voters deserve this! **3**

In reading the Arborist's Report Appendix I, some trees scheduled to become sawdust or wood chips are not diseased, but have trunks that are not perfectly straight. The majority being cut are "impacting the project and construction"! The purpose of an EIR is to explore all avenues of mitigation to protect the trees, environment, and their aesthetic value. I have asked the city arborist why it was not possible to plant new trees in between the more mature trees, but received no answer. Only some replacement trees will reach the same size and not in my life time. The tree plan will do irreparable harm to the "jewel of Oakland." **4**

Having grown up in Sacramento, I have a fondness for stately, mature trees and know that it is possible to properly care for and maintain them. Why can Sacramento have trees growing for 75-100 years?

Lake Merritt has an urban forest surrounding it. Mountain forests have trees that range in age and sizes of heights and canopies. Why can this not be the same here? I believe that the city's plan will deprive residents of all ages of an interesting, beautiful landscape which is aesthetically pleasing to viewers from windows, walkers, joggers or those driving by. **5**

I urge you to reconsider your plan of removing these beautiful mature trees. **6**

Sincerely,

Gloria J. Pieretti

Gloria J. Pieretti,
200 Lakeside Dr. #105,
Oakland 94612

LETTER B13
Gloria J. Pieretti
September 10, 2007

Response B13-1: The comment states an opinion on the quality of the Draft EIR but does not identify specific issues that affect the document's quality. The letters referred to in the comment are not provided. Agencies and the public were notified of the availability of the Draft EIR in accordance with CEQA and the City's established procedures. The letters from those agencies, organizations and individuals submitting comments are included in this Response to Comment document. Refer also to Response to Comment B4-1.

Response B13-2: All letters received by the City in response to the Notice of Preparation are included in Appendix C. If the same information appears more than once in the appendix, it is because it was submitted by more than one individual. Letters requesting information through Open Government, unless also submitted as comments on the Notice of Preparation, are not included. CEQA and the *CEQA Guidelines* require that the comments on the Notice of Preparation be considered in determining the scope of the EIR but do not require that they be reproduced in the Draft EIR. The letters are reproduced as a convenience to the readers of the Draft EIR. Hard copies of the letters are available at the City of Oakland Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315.

Response B13-3: The aesthetic impacts of the tree removal are evaluated in Section IV.M, Aesthetics. Refer also to Master Response M-1 and Responses to Comments B3-3 to B3-9. The remainder of the comment pertains to the merits of the project and is noted.

Response B13-4: CEQA requires that the effects of a project be evaluated and that significant effects be identified and mitigated, if mitigation is feasible. The aesthetic effects of the project are evaluated in Sections IV.M, Aesthetics. No significant effects were identified and therefore no mitigation is proposed. The comment correctly states that trees are being removed for a variety of reasons, including that they conflict with the proposed plan to reconstruct 12th Street and create new parkland along the south shore of Lake Merritt. A comprehensive list of the reasons for removing trees is provided on page 42 of the Project Description. The remainder of the comment pertains to the merits of the project and is noted. Refer also to Master Response M-1.

Response B13-5: A tree species grown in other climate zones, outside of urban areas, and/or under different environmental or soil conditions will vary in ultimate size and stature from specimens of the same species grown in urban areas of the San Francisco Bay Area. The Draft EIR evaluates the aesthetic impacts of the tree removal in Section

IV.M, Aesthetics. Refer also to Master Response M-1 and Responses to Comments B3-3 to B3-9.

Response B13-6: The comment, which pertains to the merits of the proposed project, is noted.

Letter
B14

To Elois A. Thornton
Plan IV

Fr Ken Pratt

My brief comments are as follows:

I) Lake Merritt & Lake Merritt Channel Improvement

12th Imp.

The culvert replacement at least, will have a minor effect on water flow & lake water quality 1

12th reconfiguration
The Bid or Bids exceed projected cost. 2

4 acre park If it was to be built, it would be under used because of its location, and the wind at the south end of the lake, generally no park maintenance = blight 3

Lake Merritt Channel

El Embarcadero
not a good idea would cause increased traffic & ped issues, at other nearby intersections 4

currently operating at a D-F rating **4 cont.**

This is a Cal-Trans boondoggle and
the fault of our city parent (or community planners) that allowed **5**
the 580 Freeway to be built
(White flight to Castro Valley & Beyond)

Pergola What a waste of money as **6**
a contractor I wished that I had bid
on that project 475,000?

East 18th St. pier **7**
unrealistic cost improvement

Widen Lake Merritt paths and add bike lanes
Improve existing parks (park maintenance)
Bike lanes No No No to accommodation
for the un-skilled and irresponsible.
No licensing or competency requirements **8**
necessary. Allows for open season on
ped. or runners, and increased traffic gridlock
and more smog because of decreased
traffic speeds as a result of inability
to stay up with traffic and a total dis-regard
for the laws of streets & highways rules of road

Letter
B14
cont.

Oakland is older city with narrow streets perhaps eliminating parking between certain hours like S.F would help 8 cont.

Our Transit system is a joke
we need more than new or [illegible] buses?
longer hours of operation serving
all commuters along with security
Bus Rapid transit will cause more
gridlock and smog plus it will
effect small business along the
area corridor 9

Sorry for this mess, but as usual
I [illegible] several projects going and
my [illegible] & I. wasn't available 10

[signature]

→ Is it OK to re-submit?

LETTER B14
Ken Pratt
September 11, 2007

Response B14-1: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted. Section IV.H, Hydrology and Water Quality of the Draft EIR, evaluates potential impacts of the proposed project on water quality.

Response B14-2: The comment does not pertain to the environmental analysis of the Draft EIR.

Response B14-3: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted.

Response B14-4: The comment, which pertains to the merits of the proposed project, is noted. Section IV.C, Transportation, Circulation and Parking, of the Draft EIR evaluates traffic and pedestrian safety issues.

Response B14-5: The comment does not pertain to the environmental analysis of the Draft EIR.

Response B14-6: The comment does not pertain to the environmental analysis of the Draft EIR.

Response B14-7: The comment does not pertain to the environmental analysis of the Draft EIR.

Response B14-8: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted. Section IV.C, Transportation, Circulation and Parking, of the Draft EIR evaluates transportation, circulation and parking issues.

Response B14-9: The comment does not pertain to the environmental analysis of the Draft EIR..

Response B14-10: The comment is noted.

Letter
B15

TO: ELOISE THORNTON

DATE: AUGUST 5, 2007

The Organization, Friends of the Lake (FOTL), of which I am a member, will be submitting a formal written response to the Draft EIR. The FOTL letter will primarily focus on the inadequacies of the EIR as it relates to the massive tree removal plans so I will not repeat those points in this letter I am submitting to you today. **1**

I will also be sending comments about the Embarcadero reconfiguration and its potential negative impacts on library staff and patrons to Ms. Thornton in a separate document.

In this particular letter, I will be commenting about the overarching lack of proper planning with regional and state agencies, and the apparent gaps in the problem identification and mitigations in this draft EIR.

At the center of the Lake Merritt projects are:

- The channel deepening and widening project
- The 12th street re-construction, and
- Adjacent marshland vegetation **2**

This year's DEIR clearly illustrates how, to this day, the project design elements STILL have NOT been properly vetted with the multiple regional, state and federal agencies, **FIVE YEARS AFTER the passage of the bond measure.**

Back in the late 1990s when the City of Oakland first envisioned its bond measure idea of people "sailing from Lake Merritt all the way to China", voters assumed the planners had involved all the agencies owning multiple right of ways AND the utility and jet fuel pipelines, pump house and railroad trestles that crossed the channel (pictures of sail boat impediments posed by utilities are pictured at the end of this letter.) These utilities either cut through the water (the pump house) or hover just a few inches above the surface water at normal tide (such as the EBMUD sewer trunk line,

Letter
B15
cont.

Port of Oakland jet fuel lines and the Rail Road trestles.) Or, in the case of BART: the Fremont train passes through a tunnel *submerged* under the channel; the top of the tunnel's outer shell POKES THROUGH THE SAND at low tide.

LATE AND CURSORY INVOLVEMENT OF REGIONAL AND STATE AGENCIES

2 cont.

As you can see from the letters contained in Appendix C, many of these agencies were notified in late 2006 or early 2007...**FIVE (!) YEARS AFTER the passage of the bond measure.** When you read the letters, they uniformly state (seemingly through gritted teeth) that they offer thanks for being invited into in the collaborative process and that the discussions have only begun.

Undeterred, the City of Oakland still maintains that a bypass channel should be cut to allow kayakers and large fish to circumvent the pump house, shrugging off the advice of kayakers who said "boaters could simply lift their boats out of the shallow water and walk around the pump house" and use an already existing ADA compliant roadway, thus shaving a million or so off the project.

3

You will see, however, in Appendix C that no attempt has been made to date, despite citizens requests, to get an opinion from the California Department of Fish and Game regarding whether it would allow the City to substantially change the nature of the food chain in this particular body of water which has been limited to moderate and small fish since the last 150 years or so, and, is an integral part of the Pacific Flyway .

4

The lack of regional planning is not limited to water way issues. In appendix C there are letters from AC Transit stating clearly the proposed 12th street reconfiguration would significantly impact regional transit.

5

Despite the substantial documentation in Appendix "C" indicating otherwise, it is the opinion of the writers of the DEIR that the designs are NOT going to present significant impacts. However no documents show that **ANY process was entered into, or, that problems were delineated, or were resolved to the satisfaction of the regional and/or state agencies.**

6

NEED FOR TOXIC CLEANUP GLOSSED OVER DESPITE ADMISSION OF PROBLEMS

The most troublesome part for me in this draft EIR was the City of Oakland's peculiar response to the State of California Department of Toxic Substances Control letter (in Appendix C) that states to the

7

Letter
B15
cont.

need to address any toxic remediation of bay fill used in the last century for the narrowing the channel. This letter was quite clear about how the possible disturbance of the fill areas could lead to significant toxic remediation that would have to be ultimately monitored by multiple agencies.

It's important to point out that the historical width of the channel, pre-1860, actually matches the width of the lake. Much is known about the general composition of the toxic bay sludge that filled in the channel, because Laney College, the Oakland Museum and the Henry Kaiser Convention Center are sitting right on top of it.

Appendix C contains a December 2006 letter from the State of California Department of Toxic Substances Control Agency which advises the City of Oakland:

1. to do an historical gathering of facts as to what is known about the fill, and
2. do a core sample so the proper agencies would be able to make plans for clean up and remediation.

7 cont.

The City did the first step, (#1) and confirmed the historical content and ***admitted*** that records indicated that the type of fill used **exceeded the state's allowable standard for toxicity. But the City skipped the important second step (#2), clearly outlined in the State's letter, directing the City to take a core sample.**

And yet, this EIR states that the toxic problems in the bay fill mud were ***less than significant.*** How can the City of Oakland presume to make that judgment without taking core samples – especially after it admitted that historical documents noted that: Toxicity levels of the bay fill exceeded acceptable levels for the State of California?

Is it possible that the City of Oakland, in the face of not being able to fund the project due to

- unrealistic budgetary goals and lack of matching grants, and
- the unfeasibility of the proposed waterway design

is fearful of being stuck in an expensive and lengthy toxic clean-up?

8

Letter
B15
cont.

Perhaps a formal core sample would "deep six" the City's plans and, in turn, the public's enthusiasm for a bond measure project they supported, once upon a time, five years ago...***a plan that left our urban forest... alone.***

9

Sincerely,

Nancy Rieser

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

Maureen F. Gorsen, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Arnold Schwarzenegger
Governor

December 21, 2006

Ms. Eloís Thornton, Planner IV
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for the draft Environmental Impact Report (EIR) for the Measure DD Project (Project) (Case Number ER060017). As you may be aware, the California Department of Toxic Substances Control (DTSC) oversees the cleanup of sites where hazardous substances have been released pursuant to the California Health and Safety Code, Division 20, Chapter 6.8. As a Responsible Agency, DTSC is submitting comments to ensure that the environmental documentation prepared for this project under the California Environmental Quality Act (CEQA) adequately addresses any remediation activities pertaining to releases of hazardous substances.

According to the NOP, the Project would improve or provide new recreational opportunities in the City of Oakland, and improve water quality at Lake Merritt and in creeks located throughout the City. The Project includes the construction of a 6.6 mile segment of the Oakland Waterfront Trail, which will become part of the San Francisco Bay Trail. The proposed trail segment is located between Jack London Square and 66th Avenue. The NOP states that properties along the waterfront designated for parkland development by Measure DD would be acquired and remediated, as needed. A cleanup plan would be developed for each site where soil or groundwater is contaminated above risk-based cleanup standards. These plans would specify measures to be taken to protect workers, the public and the environment during remediation. If residual contamination is left in place a risk management plan would be prepared in accordance with the requirements of the overseeing regulatory agency.

For each waterfront property acquired by the City as part of the Project, DTSC strongly recommends an investigation into each property's current and historical uses, and a site assessment to determine whether hazardous substances may have been released into the soil at the site. Based on this information, sampling should be conducted to determine whether there is an issue that will need to be addressed in the CEQA compliance document.

Printed on Recycled Paper

If hazardous substances have been released, they will need to be addressed as part of this project. For example, if remediation activities at the Site include the need for soil excavation, the CEQA compliance document should include: (1) an assessment of air impacts and health impacts associated with the excavation activities; (2) identification of any applicable local standards which may be exceeded by the excavation activities, including dust levels and noise; (3) transportation impacts from the removal or remedial activities; and (4) risk of public upset should be there an accident at the Site.

DTSC and the Regional Water Quality Control Boards (Regional Boards) signed a Memorandum of Agreement, March 1, 2005 (MOA) aimed to avoid duplication of efforts among the agencies in the regulatory oversight of investigation and cleanup activities at brownfield sites. Under the MOA, anyone requesting oversight from DTSC or a Regional Board must submit an application to initiate the process to assign the appropriate oversight agency. The completed application and site information may be submitted to either DTSC or Regional Board office in your geographical area. The application is available at http://www.calepa.ca.gov/brownfields/MOA/application.pdf.

If you have any questions or would like to schedule a meeting, please contact Allan Fone of my staff at (510)540-3836. Thank you in advance for your cooperation in this matter.

Sincerely,

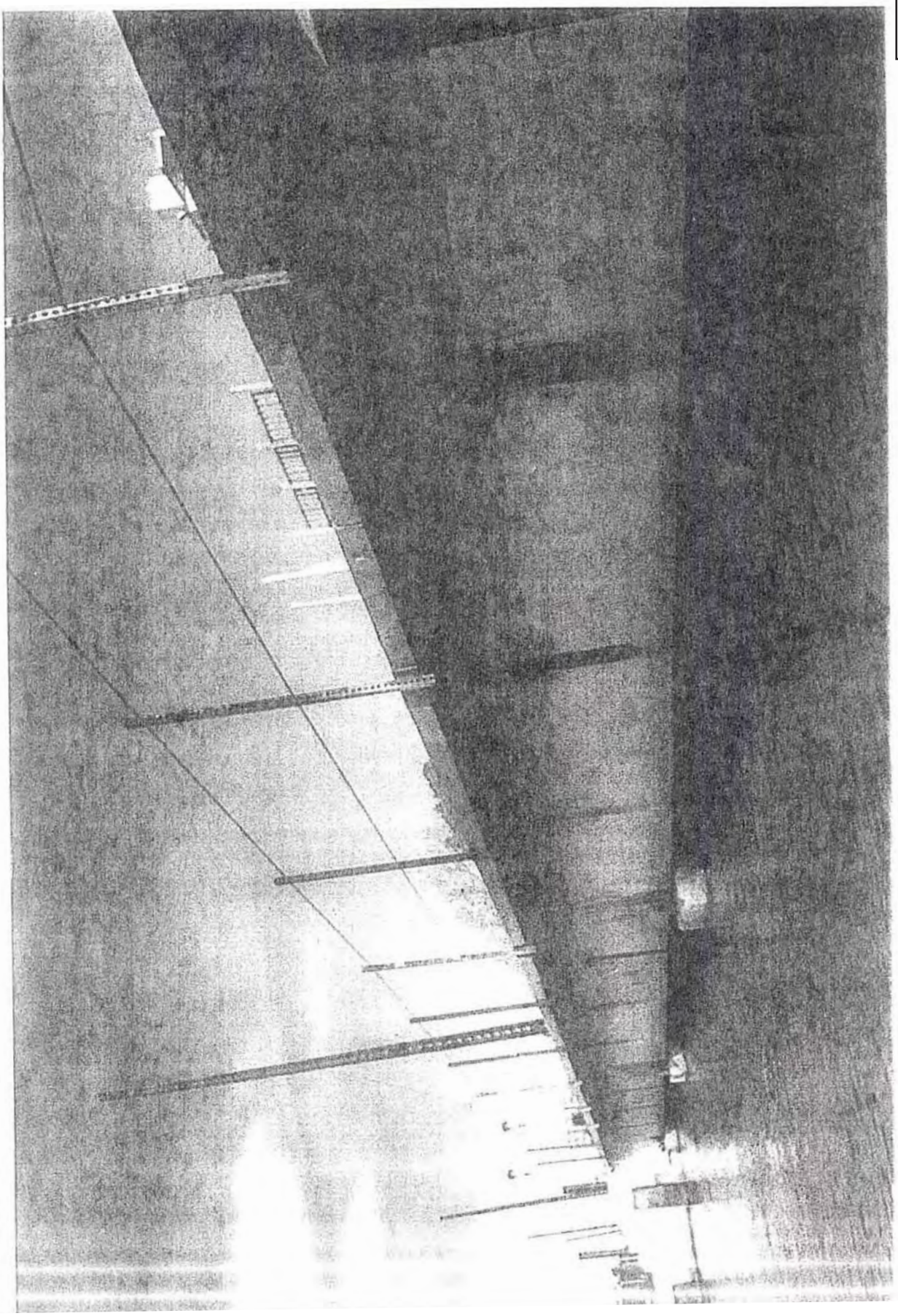
Denise M. Tsuji, Unit Chief
Northern California - Coastal Cleanup
Operations Branch

cc: Governor's Office of Planning and Research
State Clearinghouse
P. O. Box 3044
Sacramento, CA 95812-3044

Guenther Moskat
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

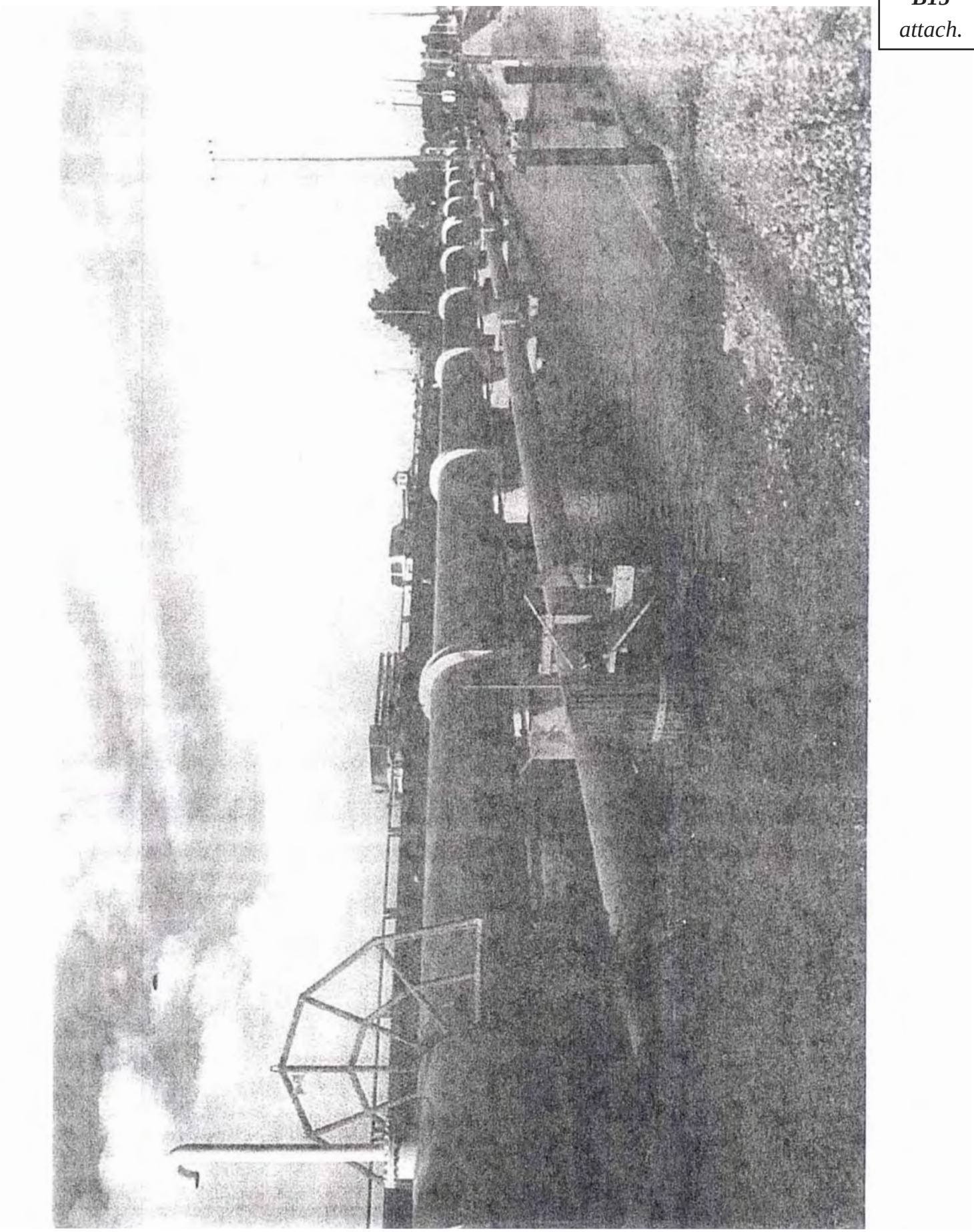
Letter **B15** *attach.*

Letter ***B15*** *attach.*



EBMUD high pressure sewer lines, RR tracks…jet fuel lines running from the Port to the Airport are just a foot off the water at high tide and at extreme high tides the water actually reaches the utilities.

Letter
B15
attach.



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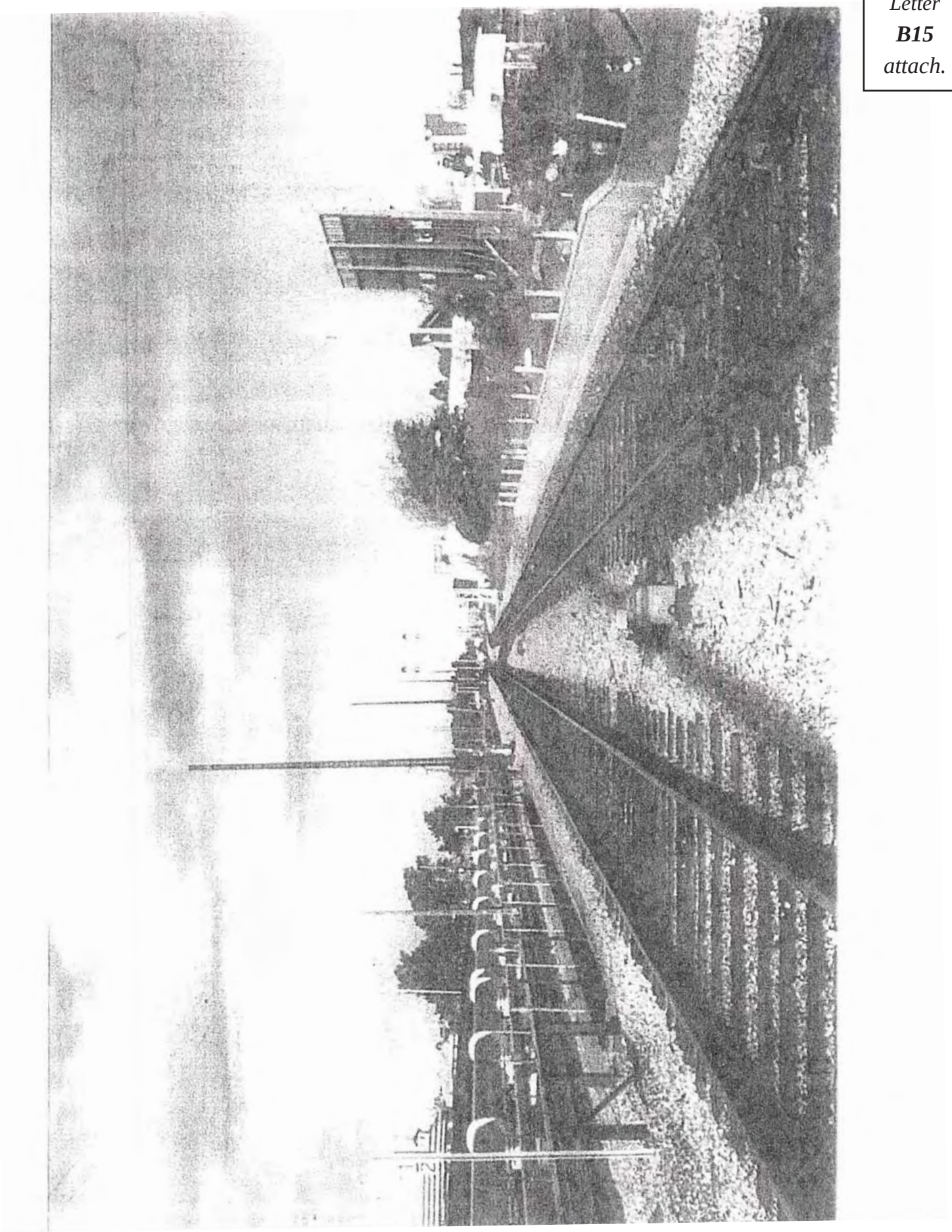

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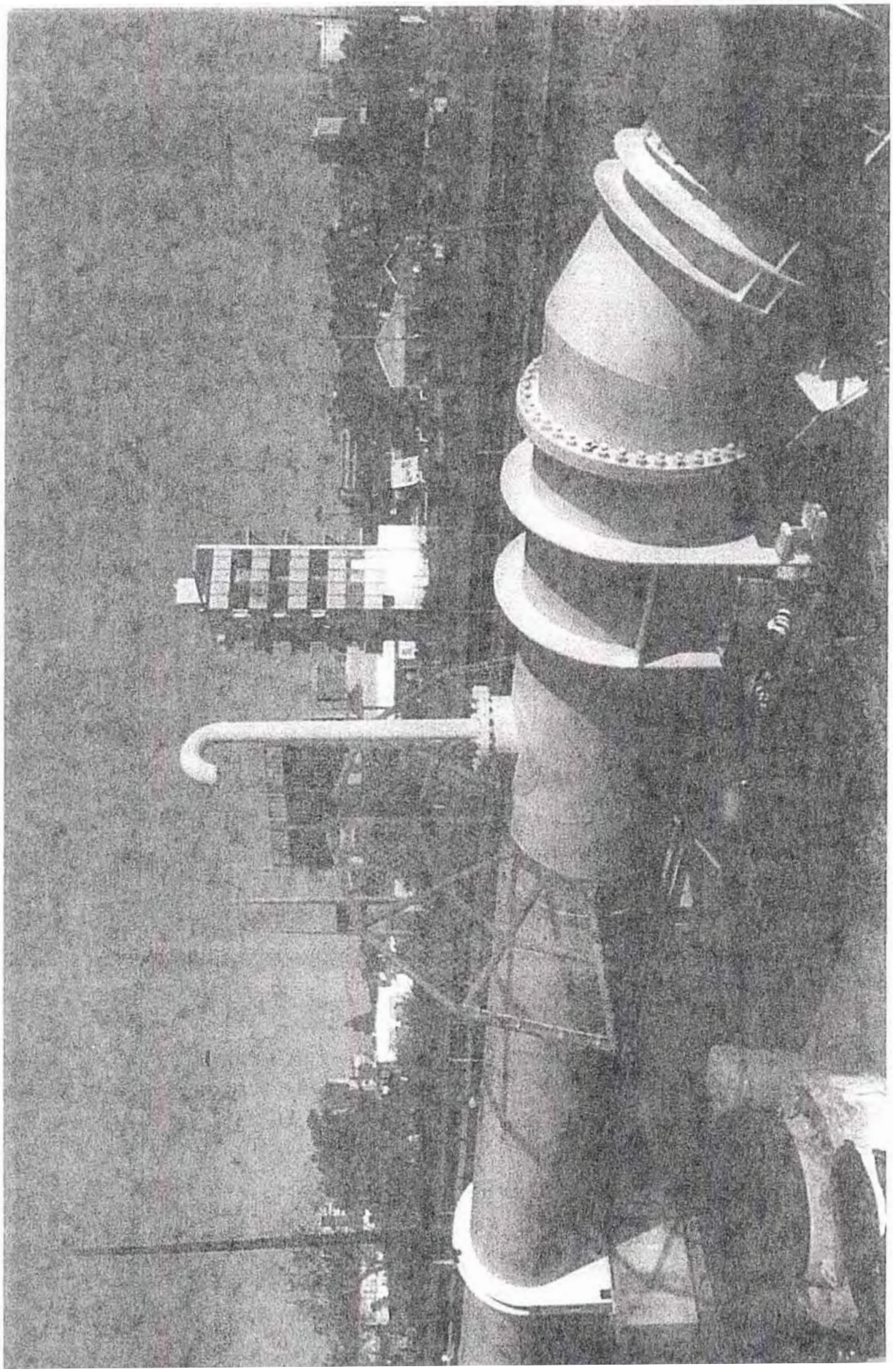

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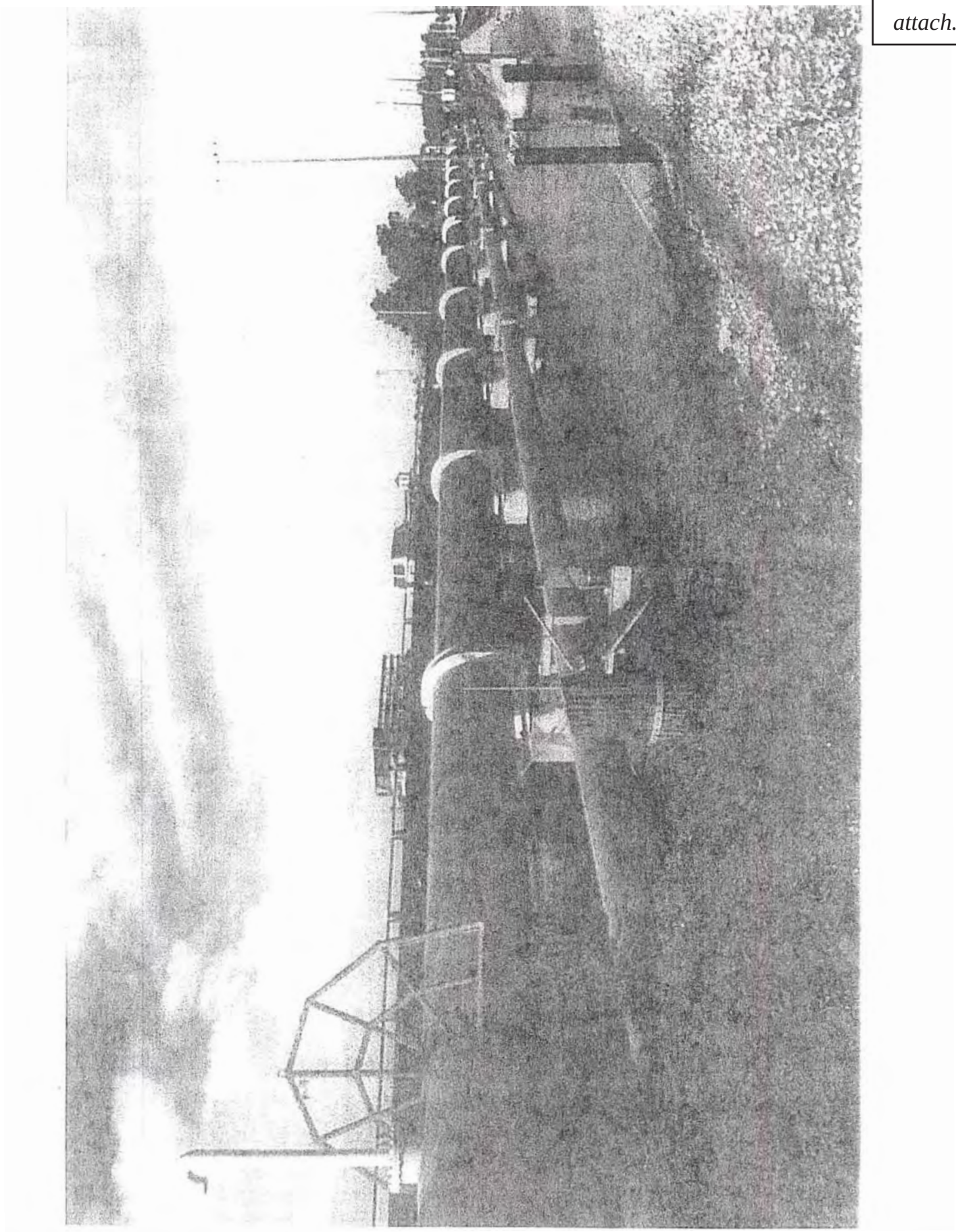

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B15
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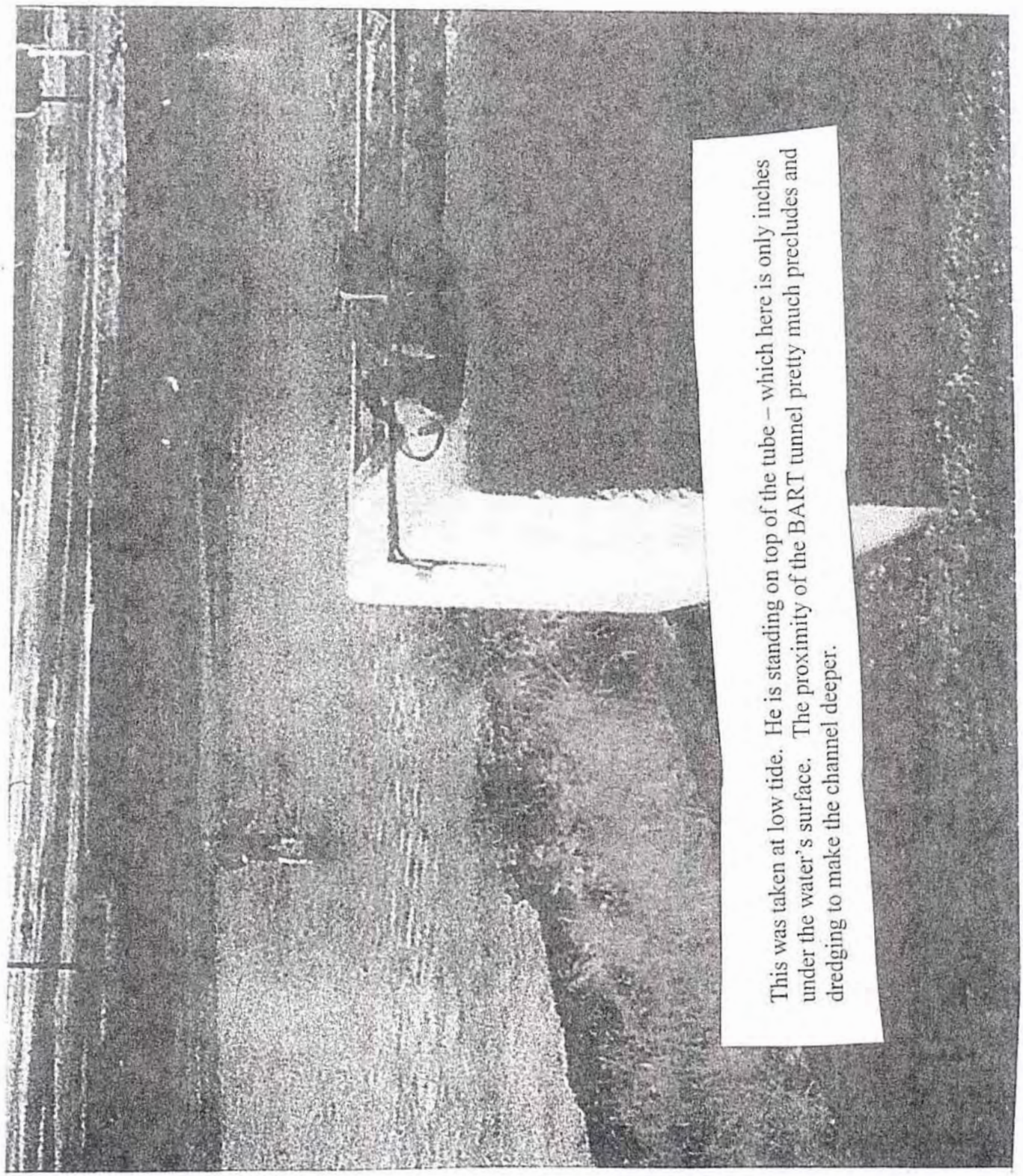


This was taken at low tide. He is standing on top of the tube – which here is only inches under the water's surface. The proximity of the BART tunnel pretty much precludes and dredging to make the channel deeper.

LETTER B15
Nancy Rieser
August 5, 2007

Response B15-1: This introductory comment is noted.

Response B15-2: Coordination with regional, State, and federal agencies is an ongoing effort in the design and feasibility analysis of any project. Project planners and designers have coordinated with many agencies on this project, and incorporated their comments into the project design. The Draft EIR evaluates the potential environmental impacts associated with implementation of the proposed project described in Chapter III, Project Description of the Draft EIR. Issuance of the Notice of Preparation was not to notify the agencies or other interested parties of the passage of the bond measure, but rather, of the City's intent to prepare an EIR for the proposed project, which is the implementation Measure DD-funded activities.

Response B15-3: The comment, which proposes an alternative to the proposed project, is noted. The suggestion will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B15-4: The Notice of Preparation of a Draft EIR for the Measure DD Project was submitted to the California Department of Fish and Game (CDFG) along with other agencies and interested parties on the City's distribution list. CDFG did not submit a comment letter on the Notice of Preparation. To date, CDFG has not submitted a comment letter on the Draft EIR.

Response B15-5: AC Transit submitted a comment letter on the Draft EIR. See comment letter A1; the City's responses are included in A1-1 through A1-23.

Response B15-6: The Draft EIR describes the existing setting of the project area as it relates to each environmental topic, analyzes impacts of the proposed project, and recommends mitigation measures to reduce potential impacts to a less-than-significant level, as appropriate. The evaluation of impacts was carefully evaluated against the City's significance criteria for each environmental topic. Significant impacts are identified in several topic sections of the Draft EIR.

Response B15-7: The comment incorrectly states that the DTSC's comments on the Notice of Preparation refer to bay fill used for the narrowing of the channel. The agency's comments refer to contaminated industrial properties located along the Waterfront Trail in an area where a shipping channel was created by widening the existing waterway or creation of a new waterway. Refer to page 304 of the Draft EIR for an analysis of the impacts of the proposed project with respect to hazardous waste sites. Implementation of the City's Standard Conditions of Approval as well as compliance with the reporting requirements of the applicable

State and/or local regulatory agencies would ensure that potential impacts associated with hazardous materials releases are reduced to a less-than-significant level. The proposed investigations and remediation are in accordance with the recommendations in the DTSC's comments on the Notice of Preparation.

The DTSC's comments on the Notice of Preparation, which are attached to the comment letter, are noted. To date, DTSC has not submitted comments on the environmental analysis of the Draft EIR.

Response B15-8: The comment pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR so no further response is provided.

Response B15-9: The comment, which pertains to the merits of the proposed project, and the attached photos of the railroad tracks, EBMUD pipeline, and other pipelines that cross the Lake Merritt Channel south of 7th Street, are noted. The photos do not provide specific comments on the Draft EIR. The photo of the 7th Street Pump Station, which includes comments that suggest an alternative to the proposed project, is noted. The comments do not pertain to the environmental analysis of the Draft EIR. The photo of the man purportedly standing in the middle of Lake Merritt Channel on top of the BART tunnel is noted. Dredging in this area is not described in the Project Description because no dredging of the Lake Merritt Channel is proposed in this area as part of the Measure DD Implementation Project.

Letter
B16

RECEIVED
SEP 11 2007
City of Oakland
Planning & Zoning Division

To: Ms. E. Thornton
From: Nancy Rieser, 437 Euclid Ave. #10, Oakland

September 10, 2007

RE: NEGATIVE IMPACTS OF THE DRAFT EIR, SPECIFICALLY AT THEY RELATE TO:

- Embarcadero Library re-configuration
- Paving over of Lakeside Drive's meadow (and trees) near the Municipal Restaurant
- No mature tree canopy: How can the negative impact of 30 years be "less than significant"?

1

---

1. EMBARCADERO RE-CONFIGURATION: LIBRARY PATRONS AND STAFF LEFT OUT OF THE PLANNING PROCESS – NEGATIVE IMPACTS ON USER GROUP CONTINUE TO BE IGNORED

In 2005, three years after the DD Bond Measure passed, a Lake Merritt neighbor showed the DD Embarcadero reconfiguration plans to both The Friends of the Lakeview Library (FOTLL) and the library staff. Imagine the collective shock when FOTLL and staff learned that not only had they been left out of the planning process completely, but that the City planners had created a design that:

- condensed the traffic of both legs of the Embarcadero (and pollution and noise) to the single leg of the Embarcadero closest to the library windows
- proposed a parking lot in the very spot where the Lakeview Library planned to add on a wing

2

City staff admitted that the library users were left out of the loop as they reckoned that the little neighborhood branch would eventually close some day (which was news to both the library staff and the neighborhood they served. The library, of course, never closed.)

When the negative impacts of the increased car exhaust and noise pollution coming through the open windows of the little library were brought to the attention to the DD project planners, the staff remained unmoved and showed a calm lack of remorse over the flawed community planning process. Any alternatives presented by the neighborhood users of the library were dismissed as "too late"...and the patrons and staff were told that they would just have to accept the added car noise and pollution.

They told the community that they just should develop a tolerance to increased noise and air pollution. That is NOT a form of mitigation. It is a form of arrogance.

Sadly, the design rigidity and lack of concern for negative impacts is still reflected today in this 2007 draft EIR. This draft EIR should have fully explored and weighed the benefits of win-win community alternatives.

3

Just one example: a cost effective option that wouldn't increase the concentration of pollution and would **DECREASE it during weekends** : simply block off both lanes during Saturday and Sunday, a la the successful Sunday closure of JFK Drive in SF's Golden Gate Park. Keep both little "short cuts" open M-F, instead of doubling up the traffic on the street closest to the library windows. This allows neighbors to use the little shortcuts during heavy weekday commute periods, yet creates a spot of quietude on the

4

Letter ***B16*** *cont.*

weekends, as NO cars would be between the library and the lake. There already exists a large landscaped area in between the two little Embarcadero streets that already has grass, brick paths and shade trees and could instantly become a mini-town square when the two streets are closed. **This space could be used as a weekend reading garden or outdoor gallery space, idea s which were the part original project goals of the Green Link Task Force.** **4 cont.**

Just as important, the City of Oakland could save 4 million dollars currently slated for street re-paving, striping, tree removals and new street lights and instead, just pay for artful, inexpensive, movable barriers. However, the City of Oakland loathes admitting its mistakes and continues to ignore the negative environmental impacts of the DD plans on the Lakeview Library. **5**

2. THE PAVING OVER LAKESIDE DRIVE'S MEADOW FOR A PARKING LOT AND THE ADDITION OF A "GRAND STAIRCASE" TO REPLACE EXISTING TREES

In 2005, the same time the public was blind sided by the announcement (at that time) of the loss of over 300 trees, Lakeside Drive neighbors were stunned to learn that the only meadow on their side of the lake was going to be replaced by a parking lot. City staff, exhibiting the same level of rigidity used with the Lakeview Library patrons, maintained its belief that the loss of the meadow was "less than significant" and that the paving over of space was "required" for the restaurant owner and patrons . To put it more simply: The greater perceived good of the restaurateur's project was worth the sacrifice of public open park space and trees, despite the fact that the parking-lot-for-open-space-exchange was concept that was NEVER vetted at ANY community meeting before or after the passage of the DD bond measure. **6**

The second half of a one-two punch came with the local Rotary Club's announcement of a collaborative building project of a "Grand Staircase" leading down to the restaurant, a staircase that was never in the original bond measure plans, was non-ADA compliant and took out trees to boot. **7**

As soon as the plans were revealed, the public made it perfectly clear that both the parking lot scheme and the "Grand Staircase" violated both the spirit and the intent of the Lake Merritt Master Plan and DD Bond Measure. The community hired a landscape architect to create an alternative plan which ultimately saved the meadow, added MORE parking spaces than the city's design and saved existing trees. The plans fell on deaf ears of the City staff and were dismissed out of hand. **8**

The Planning Commission must seriously consider alternatives that can protect the existing environment yet achieve project goals of the DD bond measure. **9**

3. NO MATURE TREE CANOPY: THE NEGATIVE IMPACT OF "30 YEARS" ON OUR SPIRIT AND HEALTH

In regards to the proposed tree removal, it's hard to know where to begin. The public, of course, was promised in earlier EIR documents that no trees would be cut. It was shocked to learn – after construction RFQs were sent out in October 2005 – that just one month later, the removal of trees were **10**

Letter
B16
cont.

just the "devil in the details" of the Measure DD implementation. The trees were now "in the way" of construction. They conflicted with the design sensibilities of the landscape designers and now – after providing beauty, helping clean air and preventing run off into the lake for years, our elder trees were artistically "inappropriate."

The city arborist and landscape designers repeatedly told the public during the walking tours that trees would get in the way of the view corridor. The public told the planners – both verbally during the tree tours and in voluminous letters not included in this draft EIR – that the trees ARE a significant part of the view and that's why people chose to live by the lake.

The response from City staff has remained the same: politely dismissive. We were told that we had "a difference of opinion." Further, we learned that we would "get used to it" and would soon forget about elder trees when the small ornamental cherry trees (that remain tiny and only have a life span of 25 years) and the comparatively small male ginkos (that will not support the birds of the Pacfic flyway) eventually come into maturity. **10 cont.**

The City's opinion that the public will "get used to" decreased beauty, increased air pollution and a loss of habitat in a wildlife sanctuary is patronizing to all Oakland taxpayers.

We were told that the narrowing of streets would necessitate the removal of a part of our urban forest. We were told it was too expensive to protect the trees, and further, it was too much of a bother to do that for trees that -- today -- are imperfect due to poor pruning practices and/or neglect or might only live 30 years or more.

The planners were told by the public that the trees weren't growing in the *middle* of the streets and it was the City's duty to find ways to ways MITIGATE possible construction damage.

To suggest that imperfect, middle aged trees need to be chopped down rather than being properly attended to by an arborist is like deciding that all older relatives at a family reunion should be set out on ice floes to die instead of going to a doctor to be properly attended to. **11**

The City of Oakland maintains that absence of a tree canopy for thirty years – a canopy that cleans pollutants from the air and provides beauty for humans to see and experience -- is "less than significant."

Let me be perfectly clear about the significance of the time span of thirty years. **12**

- Thirty years: nearly one half of most people's lifetimes.
- Thirty years: the rest of my life on this planet.
- Thirty years: the entirety of a childhood and well into parenthood for many.
- Thirty years: 8 to 10 generations of wildlife that will be denied a proper habitat when a substantial part mature canopy is cut down

Letter
B16
cont.

To dismiss the impact of 30 years is to dismiss the value of beauty and health benefits that these trees provide Lake Merritt residents of all ages. Sadly, it also underscores the City's complete lack of regard for the important role that nature plays in our urban environment. **12 cont.**

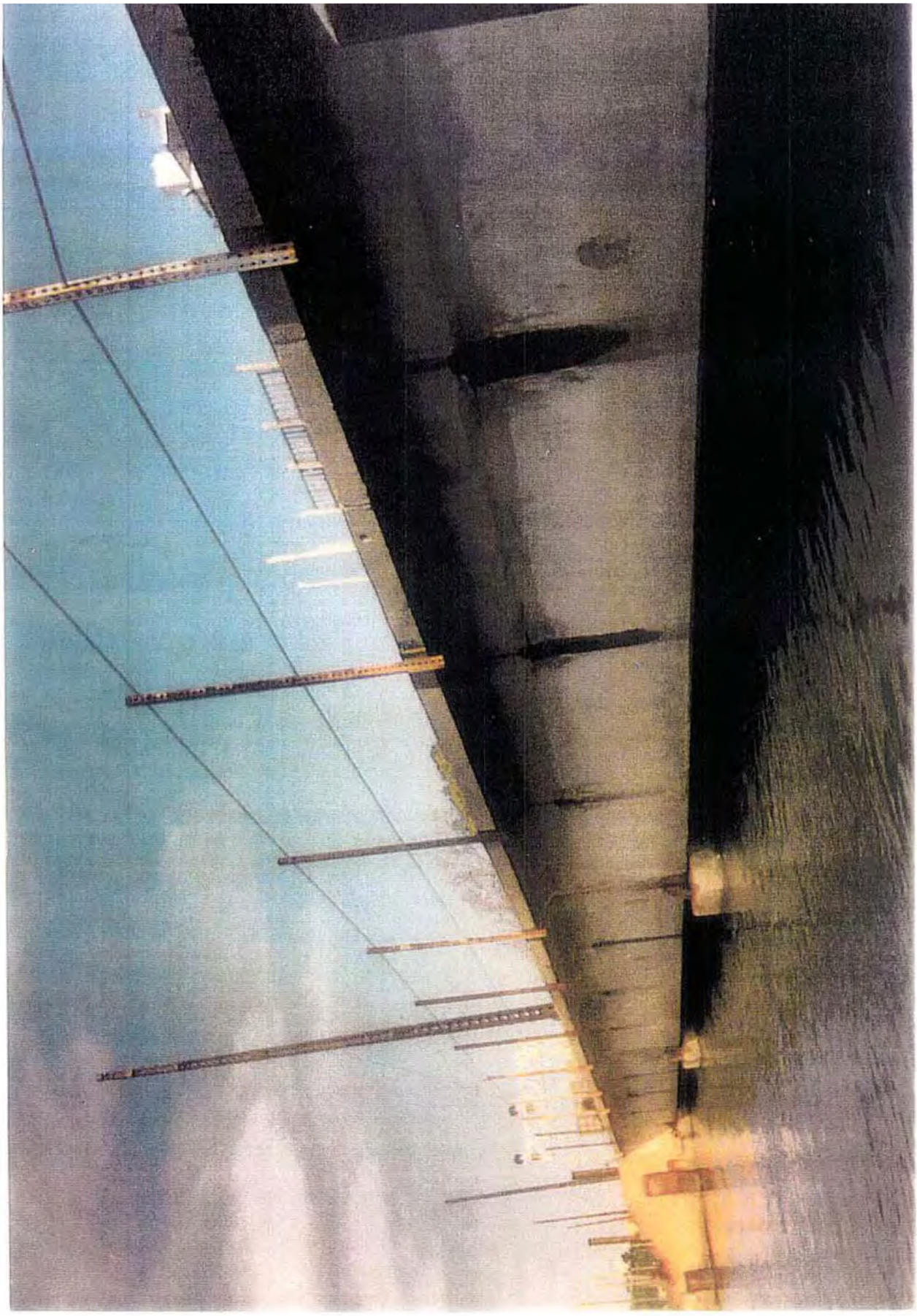
And now the City planners tell us they didn't budget properly back in 2002. They didn't receive matching grants and they low-balled the budget on most of the Lake Merritt projects. Ironically, we are told that the only money they have now to spend out of the 60 million dollars set aside on hold, presumably collecting interest, is just enough money to buy for gas...for the wood chipper. **13**

This draft EIR is mean spirited and disturbing and ultimately will cast a long shadow over the outcomes of future Oakland bond measures for many years to the come. **14**

Nancy Rieser

Nancy Rieser

Letter
B16
attach.



EBMUD high pressure sewer lines, RR tracks…jet fuel lines running from the Port to the Airport are just a foot off the water at high tide and at extreme high tides the water actually reaches the utilities.

Letter
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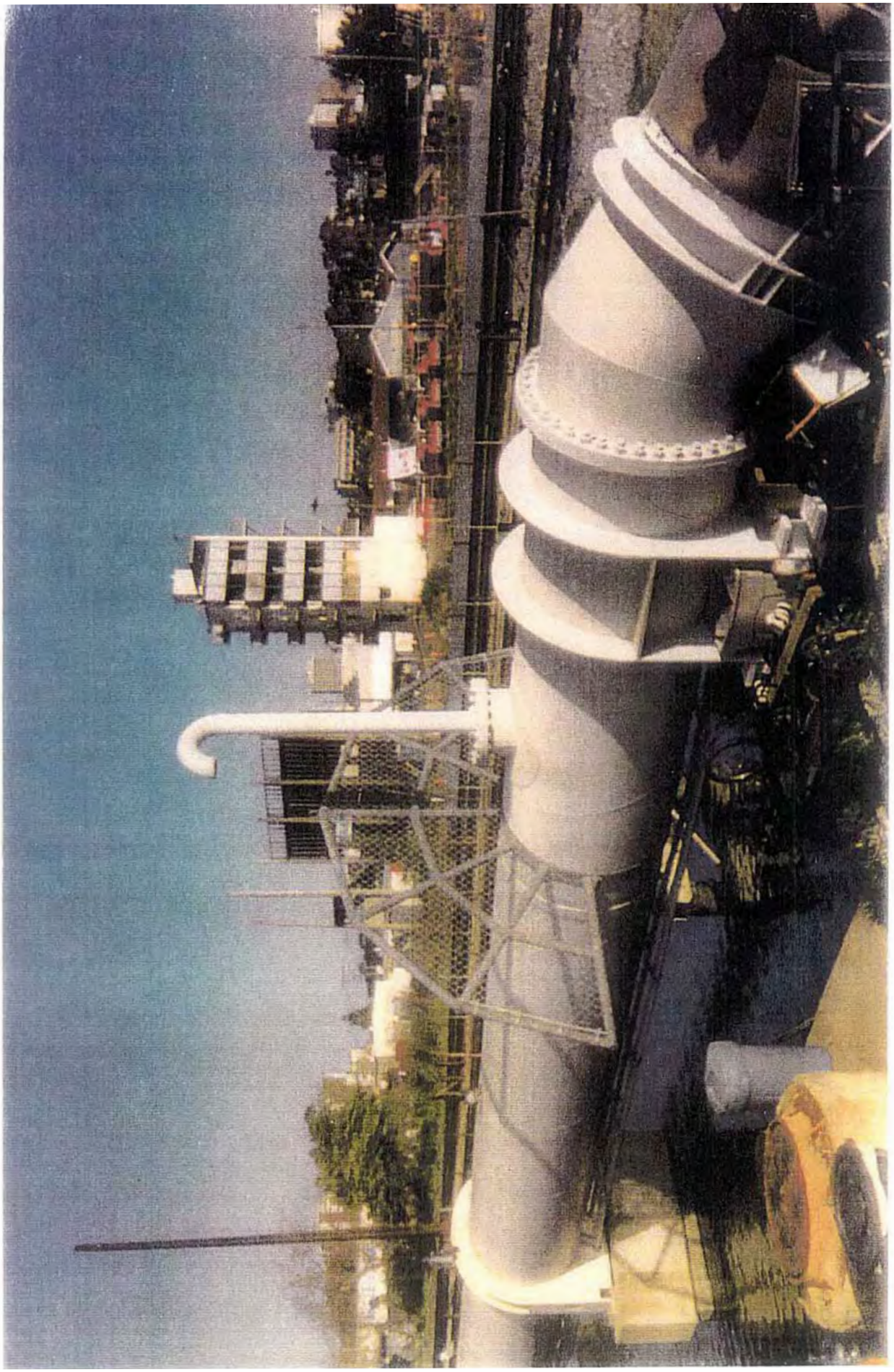

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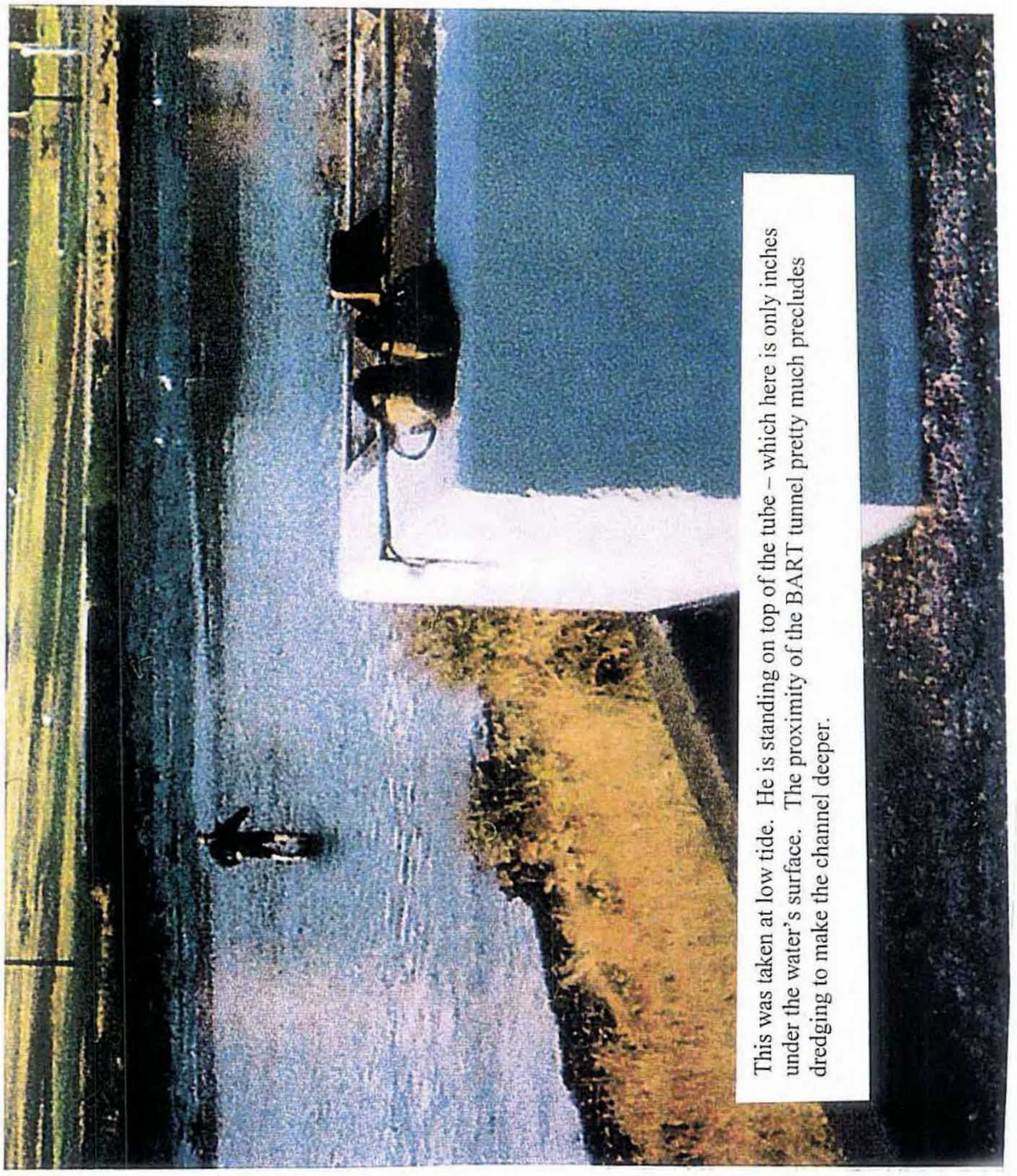

This was taken at low tide. He is standing on top of the tube – which here is only inches under the water's surface. The proximity of the BART tunnel pretty much precludes dredging to make the channel deeper.

Letter
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The square concrete box in the foreground is actually a service entrance for the Fremont Bart train which runs at a diagonal angle under the channel. The shoes are resting on the metal doors that allow maintenance access.

At extreme low tides, the outer shell of the tunnel pokes through the sand. One can actually stand on the outer shell wearing street shoes during extreme low tide.

The gentleman in the picture is standing top of the shell.

7th Street pump house is to the left, immediately out of the camera frame.

Letter
B16
attach.

The Alameda County Flood Control District pumping station at 7th

COMMENTS ABOUT BOATS AND FISH

Boats:

The grille of the 7th Street pump house is the one boating impediment that cuts completely across the water (unlike the other utilities that will simply snap off sail boat masts at the base or decapitate the boat handler at high tide.)

The solution for small boat passage around the pump house blockage: **"PORTAGE"** ...
A boater simply picks up his kayak, walks up the small bank, goes around the pump house **on an existing ADA compliant** roadway and then returns the vessel to water. To make everything ADA compliant, the City of Oakland could pave a narrow five foot long walking path to and then from the pumphouse.

Fish Passage:

As per Alameda County Flood Control District: the heavy-duty grille cannot be removed – it's job is to keep garbage from wrecking the pumps. **There are large gaps between the tongs below the water surface to allow large fish to pass through.** The gaps are not large enough to allow tree logs (a submerged log can sink a small boat in the harbor) harbor seals, sharks, etc.

LETTER B16
Nancy Rieser
September 10, 2007

Response B16-1: This introductory comment is noted. See responses to specific issues summarized in this paragraph as follows:

- Embarcadero Library re-configuration (Refer to Responses to Comments B16-2 to B16-7)
- Lakeside Meadow (Refer to Responses to Comments B16-8 to B16-11)
- Tree Canopy (Refer to Responses to Comments B16-12 to B16-14)

Response B16-2: Detailed discussions of air and noise impacts associated with the proposed project are included in the Draft EIR, in Sections IV.D, Air Quality and IV.E, Noise, respectively. No significant effects associated with the Lakeview Library were identified and no mitigation is required. Other statements in the comment pertain to the merits of the proposed project and not the environmental analysis of the Draft EIR.

Response B16-3: The purpose of the Draft EIR is to evaluate the environmental effects of the proposed project, as it is described in Chapter III, Project Description, of the Draft EIR. It is not the purpose of the Draft EIR to identify and evaluate all design options proposed by the community, but instead to recommend feasible mitigation measures for environmental impacts that would result from implementation of the project, as proposed.

Response B16-4: The comment, which proposes an alternative to the proposed project, is noted. Appendix E presents data indicating that closing both couplets would cause a large increase in traffic delays and congestion at nearby intersections.

Response B16-5: The comment, which pertains to the merits of the proposed project, is noted. The suggestions will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B16-6: The comment, which pertains to the merits of the proposed project, is noted. Refer to Response to Comment B8-1 for additional information on other variants of this project element considered during the design process.

Response B16-7: The comment, which pertains to the merits of the proposed project, is noted. Also see Response to Comment B8-4.

Response B16-8: The comment, which proposes a variant to the proposed project element, is noted. Refer to Response to Comment B8-1 for additional information on other variants of this project element considered during the design process. The

comment also includes statements pertaining to the merits of the proposed project, which will be considered by the City of Oakland decision-makers during review of the merits of the project.

Response B16-9: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted. The City Planning Commission will consider the Draft EIR, comments received, and the City's responses prior to certifying the Final EIR and approving the proposed project.

Response B16-10: The comment, which pertains to the merits of the proposed project, is noted. The Project Description of the Draft EIR describes the trees that would be removed as part of the project and Sections IV.F, Biological Resources and IV.M, Aesthetics evaluate the impacts associated with the removals. No significant impacts were identified. For additional discussion of tree removals also refer to Responses to Comments B3-3 to B3-16.

Response B16-11: The comment, which pertains to the merits of the proposed project, is noted.

Response B16-12: The comment, which pertains to the merits of the proposed project, is noted.

Response B16-13: The comment, which pertains to the availability of funding for Measure DD, is noted.

Response B16-14: The comment, which is an opinion on the environmental analysis of the Draft EIR, is noted.

The photos attached to the comment are the same as those included with comment letter B15. Refer to Response to Comment B15-9

Letter
B17

01-11-07

John WILSon

CITY OF OAKLAND

EQUAL ACCESS ORDINANCE

Final comment

Please Include Lake merritt master Plan in DDEIR.

MAÃU ÑÔN KHIEÁU NAÏI (Tieáp theo)

Chæ Daønh Cho Ban Söû Duïng

Xin cho bieát tröôøng hôïp khieáu naïi naøy ñaõ ñöôïc giaûi quyeát nhö theá naøo:

IN REGARDS TO DD ENVIRONMENTAL IMPACT REPORT(EIR).

Please read Lake Merritt ~~Plan~~ Park master Plan. Published July 2002.

(JW)

SPECIFICALLY:

Pages: Including

(JW)

& Section 3 Pages 29 Thru ~~55~~ 55

Please answer why oakland can not Follow The outline Sugested in the Lake Merritt Park master Plan. Specifically in Regards To Tree management, OF The oldest designated Wildlife Sanctuary in The United States.

Ngöôøi Lieân Laïc/Chöùc Vuï: _____

Ñieän Thoaïi Ban Ngaøy: ( ) _____

Moãi Ban/Cô Quan phaûi löu moät baûn sao cuûa thö khieáu naïi trong it nhaát 3 naêm. Xin göûi moät baûn sao cuûa thö khieáu naïi ñaõ noäp cho Vaên Phoøng Bình Ñaúng trong vieäc Söû Duïng Dòch Vuï (Equal Access Office) trong voøng 30 ngaøy keå töø ngaøy nhaän ñöôïc khieáu naïi.

Xin Göûi Maãu Ñôn naøy tôùi: CAO-Equal Access Office, 1 Frank H. Ogawa Plaza, 3rd floor, Oakland, CA 94612

Please Publish Pages From the Lake merritt master Plan Including Section III-29; III-30; III-32; III-34; III-35 III-37. Do not limit The EIR To these Pages.

CAOeao0707aV1

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Letter
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Cultural Landscape

- In the 1870s, the area, then pristine, was inhabited by a handful of settlers and a few Costanoan (Ohlone) and Miwok Indians. At the head of the slough (the present location of the Grand Lake Theater) was a pier operated by the Peralta brothers for boats transporting timber or cattle products to the bay.
- In 1909, during Mayor Frank Mott's tenure, Oakland acquired the entire lake frontage, set up the first Park Commission and began to develop Lakeside Park. The Embarcadero area including Trestle Glen Creek and Lakeshore Avenue to Park Street had wooded creek land, spacious upper areas, natural and historic oak trees. Between 1907 and 1912 the road around the Lake was paved, the boathouse and canoe house were built, a boat landing was created and the Camron-Stanford house was acquired for the new Oakland Museum
- In 1909, the architect Oscar Praeger was asked by Mayor Frank Mott to design parts of the existing landscaped 45-acre Lakeside Park. Preliminary ideas included the original bowling green and fountain site, augmented by live oaks with deciduous oaks, (Quercus cerris, rubra and coccinea), groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries.
- Trees were added from the 1915 World's Fair held on Treasure Island. At one time, a conservatory similar to the Conservatory of Flowers in Golden Gate Park existed on Adams Point in Oakland.
- The original lights, which are today a landmark, were installed in 1925 by consulting electrical engineer, Romaine W. Myers. The "Necklace of Lights" referred to the 128 electroliers installed along the shoreline and the "Festival Lights" were the strings of lights suspended between temporary poles and the electroliers. The circuit included 3,400 lights. In 1946, a Dr. Brown bought the discarded "Festival Lights" from a junkyard and they ended up lighting a mission, mission hospital and nearby villages close to the City of Swatow, China.
- Fairyland was built in the 1950s and reputedly served as the inspiration for Disneyland. The architect of approximately 50 of the original structures was William Russell Everritt. Approximately 60 settings based on fairy stories and Mother Goose rhymes form the pioneering playground. Currently, the non-profit entity run by Nancy Stark has renovated the gardens, entry and oversees educational programs. New programs will include a reading and learning program for preschool children and a volunteer gardener's docent tour of the Fairyland grounds. Mapping and plant collection lists exist for the Fairyland grounds.
- In November 1999, the one-third-acre Bonsai and Suiseki Display Garden opened. This nationally known collection of precious trees and stones includes a display booth, a fence surrounding the bonsai collection with entry gate, volunteers' office, display building and future workshop. It serves as the open-air cultural museum of the Golden State Bonsai Federation Collection - North. Many bonsais, by outstanding masters and collectors, have been in families for 20, 30 or 40 years. A special 400-year Japanese black pine bonsai was part of the 1915 Pan Pacific Exposition in San Francisco.

Letter
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attach.

PARK LANDSCAPE

Figure III.24 Existing Vegetation

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Vegetation Survey and Analysis

A tree survey was conducted, which identified a wide variety of planting in Lake Merritt Park and served as the basis for the Existing Vegetation Plan. Vegetation is classified into the following zones:

- Coastal bluff plant communities
- Fenced area (Fairyland and Botanical Garden)
- Mixed oak woods
- Mixed pine woods
- Groves of other trees
- Flowering ornamental trees (accent)
- Street trees
- Lawn
- Significant and historic trees

Historic trees are those planted after the 1915 World's Fair and/or trees referenced in Praeger's original planting design, such as the New Zealand Tea trees. These trees were identified largely from early writings and plans. Some trees have been newly planted (replacing those diseased), but there has been much resistance to planting trees because some residents prefer to preserve their view of the Lake. There was a large planting of ornamental cherry trees during the 1950s, but many of the trees were vandalized.

Significant trees are those trees that have grown to a large specimen size and/or trees or groves of trees that form a special, sanctuary space. Specimen trees include some specific trees within the Botanical Garden that were identified as "thriving" in the East Bay but not in San Francisco.

Lawn occurs predominantly in areas without trees as well as areas under trees. The planting slope to the west of Fairyland was once groundcover, but due to lack of maintenance, a rodent population became problematic.

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PARK LANDSCAPE

Landscape Themes

Bio-diversity

The Landscape Plan will focus on enhancing the biological diversity and variety of life at Lake Merritt Park. Lake Merritt is the first wildlife refuge declared in the United States. The challenge is to enhance this wildlife refuge within an encroaching urban environment while responding to increasing human recreational demands. The Landscape Master Plan builds upon the existing wildlife habitat and park, offering a wide range specialty plants and environments. Restoring lost vegetation such as oak trees along the narrow vegetated perimeters of the Lake will provide a wider range of habitat and wildlife corridors to balance plant, animal and human needs.

Multiculturalism

Building upon the multicultural theme, development of the Botanical Garden extensions beyond the fenced gardens will capitalize upon the existing plant collections. Low groundcover massing of plants such as Hemoracallis and Phormium tenax will provide hardier theme plantings beyond the fenced areas. These plants will be selected from the Mediterranean climate, African continent, temperate and mild temperate climates of Asia and Australia, tropical climates of New Zealand, native Bay Area habitats and drought-tolerant species.

The drought-tolerant garden will combine plants from all areas to provide a design theme based on form, shape, color and textures. The Botanical Garden extensions (approximately 20-45 acres) will provide seamless landscape transitions and add to the overall landscape character of the Park. Educational themes of the Botanical Garden will stress the ecological values of plants such as low water usage. In keeping with historic precedent, New Zealand tea trees (Leptospermum), "whose branches, as noted in early writings, "will droop into the lake and give a most pleasing effect," will be planted as accents along the bulkheads and at the gateway entries into the Park.

Ecological Systems

Prior to the 1909 Park plantings, the existing site supported groves of oaks and a few buckeye trees. Today striking specimens of this period still exist and add to the rarity of the Park's collection of trees. The Landscape Plan extends clusters of Valley and Blue Oaks along the Lakeside and Lakeshore portions of the Park where site conditions permit.

Low groundcovers under oak trees will provide native oak woodland habitat for plant and animal species and reduce maintenance. A balance of open lawn areas and groundcover areas will help to restore bird and animal resources.

Along the Ecological Zone a restored tidal marsh is envisioned, consisting of upland and wetland habitat and vegetation. In the Ecological Zone Area, the water's edge will be supplemented with wetland plants to enhance bird habitat. The walkway will be pulled back from the water's edge to allow more extensive wildlife habitats, similar to those existing prior to the undergrounding of creeks and damming of the estuary, and to provide more natural viewing areas for people.

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Riparian Corridors

The large arterial streets surrounding Lake Merritt follow the route of the four creeks that formerly drained into the Lake Merritt estuary: Trestle Glen Creek (Grand Avenue / Lakeshore Avenue), Glen Echo Creek (Harrison Street), Park Boulevard Creek (Park Boulevard- Foothill Street) and San Antonio Creek (12th Street). Current conditions along these former riparian corridors are as follows:

- Trees along Grand Avenue are London plane trees with limbs pruned back. Past the freeway the trees are evergreen flowering pear trees. Foothill Street has London plane trees in the street median and scattered trees and vegetation in Athol Park and along the sidewalks.
- Many of the existing plantings along these streets are an accumulation of smaller landscapes and not part of a large cohesive design theme. Scattered trees exist along both Lakeside Drive and Lakeshore Drive.

In order to visually recall the former creeks, riparian planting is proposed along these corridors, as outlined in the following table.

Botanical Name	Common Name	Comments	Habitat
TREES			
Platanus racemosa	*California Sycamore*		X
Alnus rhombifolia	*White Alder*		X
Acer macrophyllum	*Big Leaf Maple*	where conditions permit	X
Salix babylonica	*Weeping Willow*	where conditions permit	
SHRUBS			
Calycanthus occidentalis	*Spice Bush*		X

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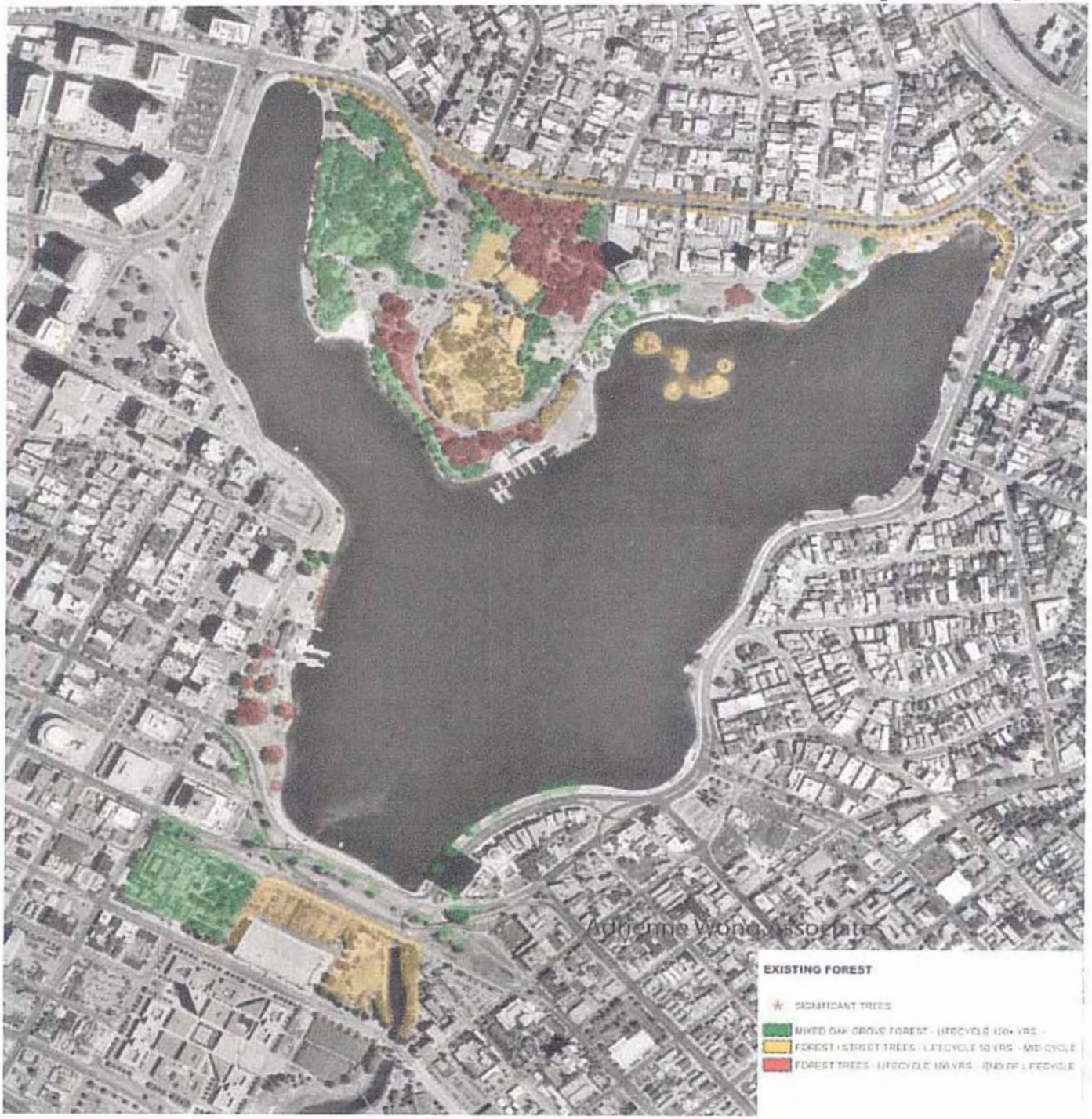
PARK LANDSCAPE

Figure III.25 Existing Forest



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Urban Forestry Program

Existing Conditions

Lake Merritt Park provides the City of Oakland with a signature urban forest in the heart of downtown Oakland, including many historic and heritage category trees, such as oaks, California buckeyes, and New Zealand tea trees. In general, trees in Lake Merritt Park (including Lakeside Park) fall into the following three groupings:

1. Grown prior to European settlement (1800s) - including scrub oaks and woodland oaks (Quercus agrifolia, Quercus kellogii, Quercus douglasii).
2. Planted from 1909 through 1915 - including deciduous oaks, Quercus cerris, rubra and coccinea, groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries. Included are specimen trees from the 1915 World's Fair.
3. Planted to replace diseased trees and sporadic plantings from 1950 to present.

Many of the Park's trees are at the end of their life span; the age of most forested sections of Lake Merritt is 87 years. Overmature trees are susceptible to pests and diseases, wind damage and hazardous weakening effects. Reforestation efforts need to be more aggressive to sustain the value of this urban forest and its wildlife and recreation value to the City of Oakland.

A comprehensive forest-management program is needed. New trees have only been sporadically planted largely due to the political climate of preserving views of the Lake. On a larger scale, it must be recognized that these forests also support a wide range of wildlife and will need to be replanted for wildlife habitat. New trees have not been routinely planted to offset the aging of the forest. Very few trees have been planted along the eastern, western and southern shores of the Lake. Luckily many of the oak trees have a longer life span. However, the effects of new oak diseases have not yet been clearly considered.

Goals

A reforestation program should be established that operates at a 25-30-year replacement cycle and includes the eastern and western shores as defined in the Landscape Plan. Consistent with the Existing Vegetation Plan, reforestation would serve the following goals

- Aesthetic - framing vistas, defining open spaces, including areas of smaller parks in Lake Merritt Park (i.e., Pine Knoll Park), accentuating riparian corridors (gateways), and providing color and visual accents.
- Habitat - multi-story landscape providing a diversity of habitat, food sources and canopy.
- Boulevard street trees - providing a border and extension of the Park boundaries beyond its present edge.

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PARK LANDSCAPE

Forestry Recommendations

Specifically, the reforestation program should include the following elements:

- Public Information: Provide the public with information about the reforestation project and process through informational brochures and signs at the sites and at the Rotary Nature Center.
- Native Plant Preservation: Preserve the remnant native plant population, especially the oaks and California buckeyes. Educate the public that this is an oak preserve and that other oak areas will be re-established in the historic areas such as Lakeside Drive, Lakeshore Drive and the 12th Street Peralta Park areas. Prepare gateway areas for Riparian-native populations and replanting at the gateways of El Embarcadero - Eastshore Park, 18th Street, Harrison - Adams Park area, and the Estuary Channel area.
- Specimen Tree Replacement: Replace individual large trees in kind, with similar species, such as the Italian stone pines along the promontory in Lakeside Park. Other large trees such as the California buckeye could be planted around the Bandstand areas. The New Zealand tea trees and the Auraucaria tree outside of the Botanical Gardens should be identified and addressed in replacement cycles.
- Reforesting High-Use Areas: Reforest high-use and high-visibility areas in Lake Merritt Park (Boathouse, Sailboat house, Tropical Garden area, New Promenade area, Duck Pond Feeding area, etc.) with larger trees rather than seedlings. Options include using trees being removed by the tree-spade method and moving them to new sites.
- Tree Maintenance: Provide ongoing maintenance of structurally weak trees that present risks to the health and safety of the public and property. These need to be identified, monitored and removed as an ongoing safety program. The Arborist Division of the City of Oakland is addressing safety issues but is in need of more current databases and tracking systems as afforded by a GIS tree system.
- Reforesting Plant Communities: Use species and forest communities similar to those identified in the Existing Vegetation Survey and Analysis. For example, Coastal Bluff plant communities should utilize a range of species similar to those found within the existing plant community.

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Construction Coordination with Wildife

Timing of construction can have a major impact on the wildlife and habitats in the area. Different components of the new park developments should be planned and timed to ensure that any negative impact is minimized, e.g., avoid lopping trees when birds are known to nest during breeding seasons.

Letter
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PARK LANDSCAPE

Visual Analysis

12th Street Panorama

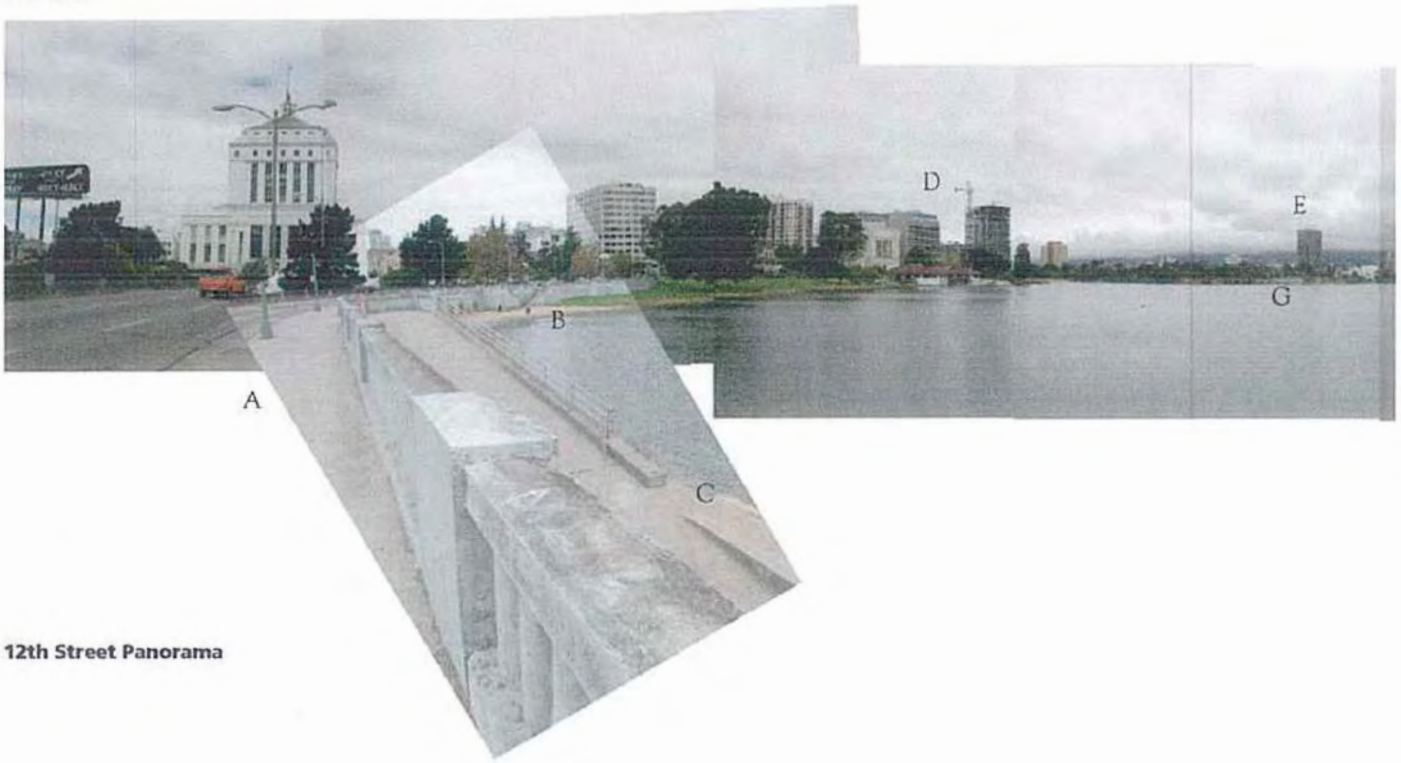
The 12th Street panorama provides many opportunities for interpretive art. The view to the north provides views of the Oakland hills and part of the watershed for Lake Merritt. There is one large building that mars the low, mass of buildings with the Oakland hills beyond. The Park portion of land is narrow and the promenade continues along the 12th street "short freeway." This is the site where the estuary water entering and exiting the Lake can be defined. It is also the historic site where the first bridge—Bridge of Sighs—connected the old township of Brooklyn and Oakland. It has a colorful history that can be interpreted here. This portion also links the Lake with Kaiser Convention Center, the Oakland Museum and Laney College. To the west is the Fire Alarm building. This site can be improved with more civic uses and landscape - park connection to the Lake.

A. Fast-moving vehicular traffic conflicts with pedestrian, bicycling activities or crossing to Kaiser Convention Center area. Provide elevation or landscape separation experience to buffer from vehicular traffic.

B. 30' to 40' wide beach at low tide used for two regattas, in July and October.

C. High tide - narrow path to ramp access. Ramp is not to ADA codes. Second area where public can contact water's edge / lake water.

D. High-rise building can frame views across the Lake, however their mass can be imposing and unattractive. Higher degrees of facade articulaiton are desirable.



12th Street Panorama

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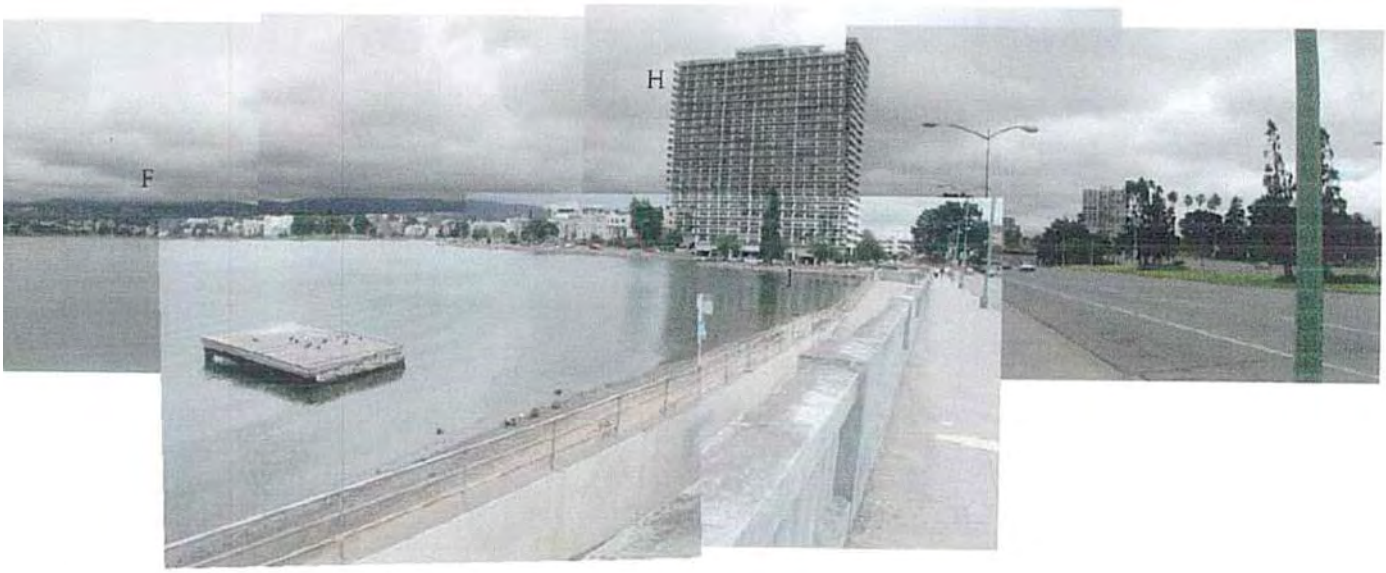
E. Few high-rise buildings on hill preserve Oakland Hills views.

F. Positive view of Oakland hills. Maintain low building heights to preserve view of Oakland hills beyond.

G. Views of sailboats and opposite shores.

H. High-rise building frames view.

I. Saltwater inflow opportunity to make tides readable.



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PARK LANDSCAPE

Snow Park Panorama

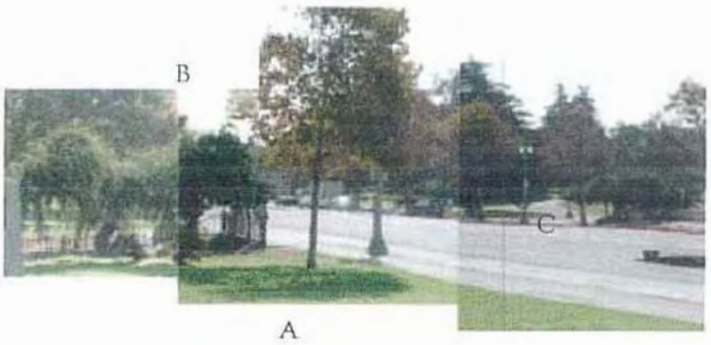
Snow Park panorama provides a large park space for commercial office workers. The expansive lawn is sometimes used by geese and their feces remain. The lawn provides a sweeping view up to the Lake with water barely visible through the park setting of mature trees. Lakeside Park looks very wooded. Additional siting of trees can visually screen the two predominant high-rises from this view. This park is a vital pedestrian link between the commercial downtown area and Lake Merritt.

A. Light standards create visual "noise" and clutter.

B. Cedar trees provide evergreen screening of buildings.

C. Good landscape views of Lake Merritt, trees and banks from Snow Park.

D. High-rise building diminishes view. Provide additional evergreen trees for screening.



Snow Park Panorama

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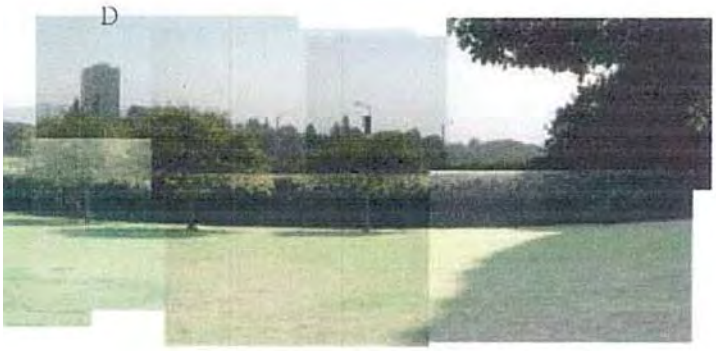
Grand Avenue Panorama

Grand Avenue Panorama

From the Grand Avenue panorama, the lawn groundcover creates a strong and positive horizontal band, extending the Park and providing visual respite from the built environment. Trees and landscape fronting the tall apartments and high-rises add significantly to the "extension" of the Park and increases the Park's apparent size. The commercial high-rises form a strong edge that is softened on the east side by the Park trees.



A. Open lawn area.

B. Mature New Zealand Tea trees have specific pruning requirements. Only a qualified arborist should prune them since damage done by inappropriate pruning will kill trees. Veteran's Memorial Auditorium Grove provides good specimens of New Zealand Tea trees that have not been damaged.

C. Lawn groundcover provides positive horizontal view.

D. Trees and landscape fronting tall buildings provide visual extension of park beyond park boundaries.

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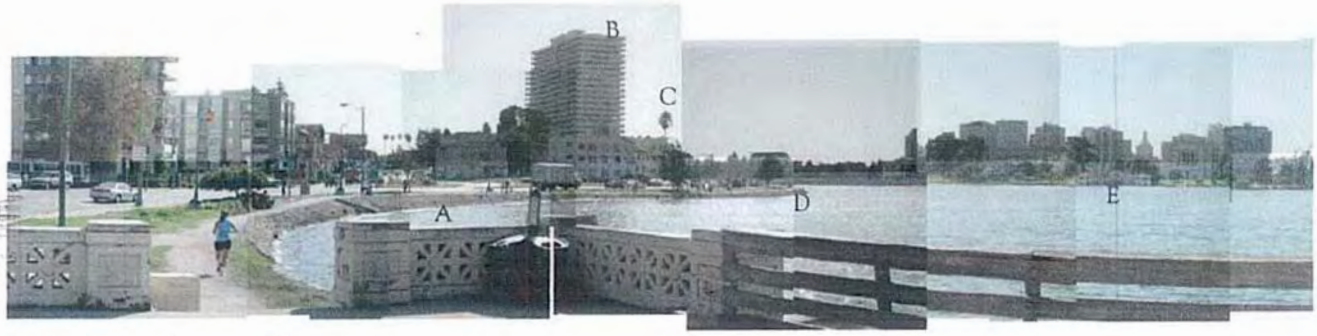
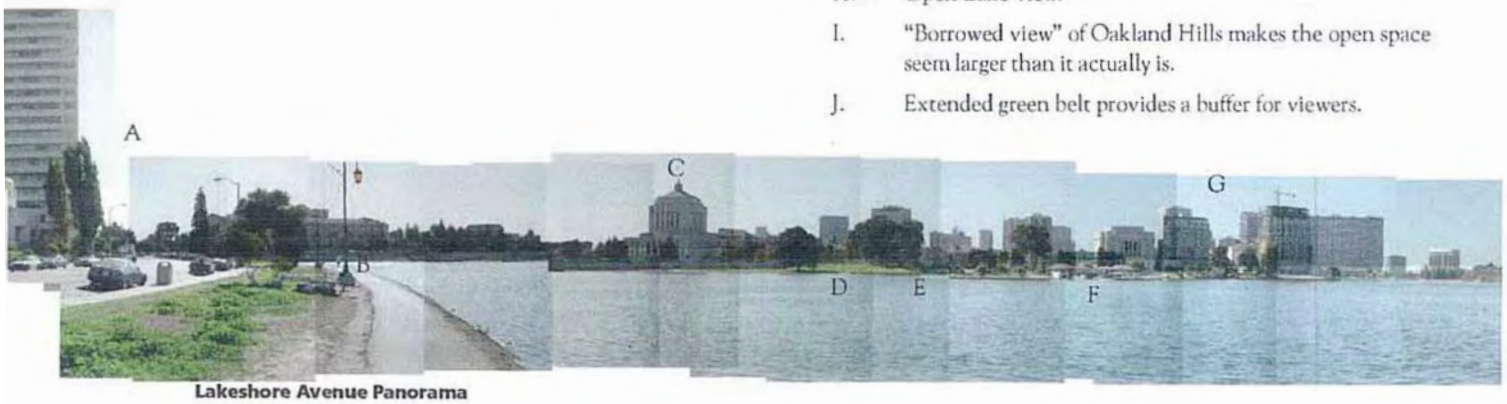
PARK LANDSCAPE



Lakeshore Avenue Panorama

Lakeshore Avenue panorama has an open feeling. There are few trees lining the Park boundary at this location. The large apartment building to the south is less intrusive at this point and probably provides residents with striking views of the Lake. From this vantage point the Federal Courthouse is visible. The Lake appears very large with a built skyline to the southwest and the Oakland hills to the northwest. The Park appears most narrow at this panorama.

A. View of apartment building's narrow side is less intrusive.
B. Retaining wall with no landscape.
C. Federal Court House.
D. Sunny open lawn area.
E. Historical Cameron Stanford House.
F. Park setting around Boathouse.
G. 19th Street skyline provides a backdrop of the Lake view.
H. Open Lake view.
I. "Borrowed view" of Oakland Hills makes the open space seem larger than it actually is.
J. Extended green belt provides a buffer for viewers.



Lakeshore Avenue Panorama

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18th Steet Panorama

18th Street Panorama

The historic pier is on axis with the Boathouse, builit in 1915 and now housing the Parks and Recreation offices. From this vantage point, the green lawn is a positive visual amenity. This historic building site is enhanced within the landscape setting. The building provides a strong architectural façade and sets the tone for the rest of the architecture within the Park. The view of the downtown skyline is striking. The banks need landscape improvements to the south and north of the pier. To the south of the pier is a view of the only angled bank where goslings can exit the lake (besides the boat ramp at the Sailboat house). The pier is in need of restoration. The balustrade details provide a solid architectural element that is enduring and important to maintain.

A. Balustrade details of 18th Street Pier provides historical time setting, pier in need of repair.

B. High-rise building provides housing density in relationship to ground area used. Guidelines for landscape trees or terraces could soften impact from ground view.

C. Existing palm tree creates striking look against skyline.

D. View of angled bank from 18th street pier provides one of the few places where goslings can exit the lake.

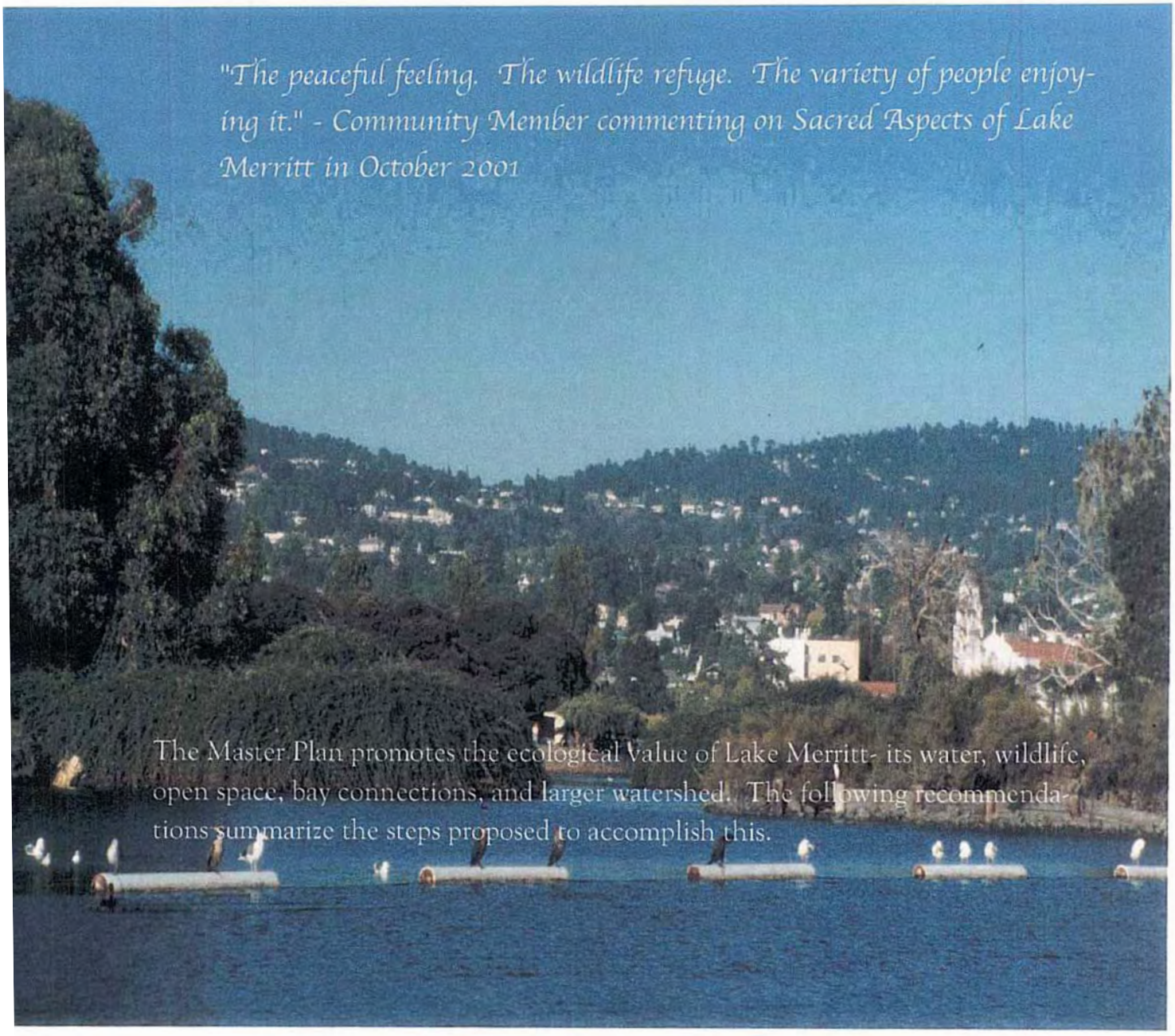
E. Boathouse is on direct axis view from 18th street pier, view provides park architectural setting.

F. View of 19th Street building skyline from 18th street pier.

G. Band from green lawn enhances view. Banks of soil need improvement

Letter
B17
attach.

ECOLOGY



Letter
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attach.

Recommendations

Water Quality

1. Improve water quality by controlling pollution in the watershed. This should be accomplished by:

- A significant increase in enforcement of litter laws
- Continuous educational campaigns targeting businesses where litter is generated
- Educational and enforcement campaigns to eliminate waterfowl feeding
- See applicable activities on list of projects from water quality task force.

2. Control and remove trash that enters the Lake from storm drains and from the shoreline. This should be accomplished by:

- Installation of storm drain filters (CDS or other brand) five each year for 12 years
- Continuation of the Clean Lake Program to remove trash from the Lake.
- Building hook shaped "trash traps" into the shoreline at several locations when the bulkhead wall is replaced.

3. Improve water circulation in the bottom layer of the Lake by enhancing the connection to the estuary via the channel. This should be accomplished by:

- Forging an agreement with Alameda County to make tide gate closure decisions on a 12 hour basis.
- Removing the culvert condition at 12th Street and lowering the weir elevation to a point that maximizes water flow while minimizing disruption to recreational and scenic resources.
- Eliminating flow obstructions in the channel such as the culverts at 10th Street, the Flood Control Station (7th Street), the railway tracks and utility structures.
- Completion of a hydrology survey to recommend specific Lake water levels and alternatives for achieving these.
- Relocating the Alameda County pump facility to a location closer to the Lake and drawing water from the bottom of the Lake.

4. Provide for long term control of sediment, seaweed and plankton. This should be accomplished by:

- Continuation of algae and widgeon grass harvesting with establishment of several sanctuary areas
- Obtaining a small, city owned dredge boat (run by the harvester operator) to reduce the area of widgeon grass infestation and remove sediment around storm drains and docks
- Based on monitoring data, targets for reduction of nitrogen entering the Lake from creeks and storm drains should be established.

Letter
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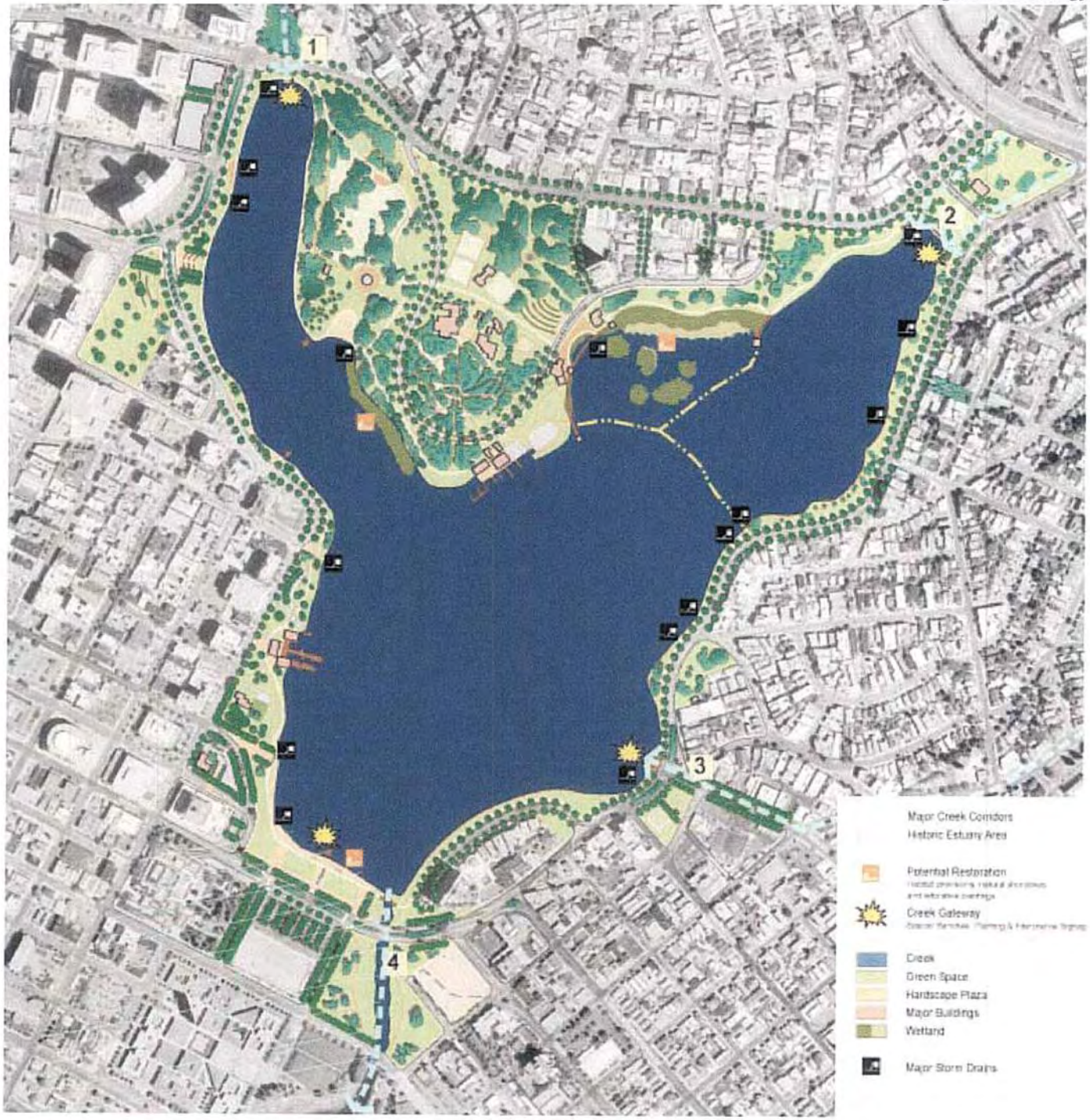
ECOLOGY

Figure III.26 Ecology



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Wildlife

1. Enhance specific areas for wildlife, including creation of a ecological zone in Lakeside Park (Shoreline Zone). This should be accomplished by:

- Moving the path away from the shoreline in key locations, creating a more natural (slight gradient) shoreline, relocating inconsistent uses such as parking lots, active playgrounds, and operations that are not waterfront dependent.
- Calming motor and pedestrian traffic near the duck pond by expanding walkways, and separating users
- Creation of a paved fresh water pond at the mouth of outfall # 1 by the Bandstand beach
- Creation of a wetland area by removing the center of one of the islands, depositing it around the shoreline, and creating a fresh water pond within the island
- Implementation of a habitat improvement plan on the islands
- Providing perches for birds on the water side of the perimeter bulkhead walls

2. Restore a managed, youth fishing program, beneficial to those from all areas of Oakland. This should be accomplished by:

- Accepting offers from the state Department of Fish and Game to stock steelhead trout and conduct "Fishing in the City" programs.
- Establishment of rules including "no fishing" zones in natural areas or where conflicts with other park users may occur
- Requiring completion of an educational program prior to obtaining a mandatory city fishing permit

3. Establishment of a policy that the wildlife refuge should be managed primarily for migratory waterfowl. This should be accomplished by:

- An educational campaign to eliminate public feeding of birds
- Management to reduce overwhelming concentrations of pigeons, resident geese, and similarly domesticated fauna

1 Glen Echo Creek

2 Pleasant Valley Creek / Trestle Glen Creek

3 E. 18th Street and Dock

4 12th Street / San Antonio Creek

Letter
B17
attach.

ECOLOGY

Goose Management

The unique balance between wildlife and human users at Lake Merritt is threatened by the large populations of geese. Both recreationalists and geese utilize the lawn areas of the park. The presence of fecal material from such high numbers renders the areas unusable for human recreation. Walkways, docks, bowling greens, and tables are also covered in goose excrement. This is especially problematic in areas where children congregate and during molting season (June to August). Geese feed on the mown lawns and are attracted by the visual openness. The geese typically congregate nearer the shoreline, however it is not uncommon to find them along Grand Avenue or in Snow Park.

The LMMP recognizes the need to review potential wildlife management practices to ensure that the notion of refuge is afforded to all. During the outreach process, many voices in the public expressed that geese are negatively impacting the park. As a significant ecological resource, Lake Merritt management should be sensitive to habitat provisions for wildlife. Practices should emphasize native avian species (shorebirds, migratory waterfowl) and fisheries. By implementing a range of techniques, domesticated wildlife such as geese should be brought into balance with other species and park uses.

Background Information ("Managing Canada Geese in Urban Environments")

- Canada gee se have undergone a significant population increase from a few thousand in 1965 to 1.1 million in 1996 in the central United States alone.
- Lake Merritt is not a historic site for large goose poulations. In the 1940's several crippled birds were released. Their numbers grew to about 75 in 1994. By 2001, a total of 1,093 birds were noted before fall migration. After migration, about 400 resident geese remained.
- Heavy concentrations of goose feces contain nitrogen which can lead to excessive algae growth in Lakes.
- High concentrations of geese increase the likelihood of avian disease to be transmitted between geese and other waterfowl.
- Migratory patterns have been researched and coordinated with habitat protection.
- Geese at LM molt in summer early June to late July-they are flightless during this time and concentrate along the shoreline. Numbers at the lake increase dramatically during this period causing increased conflicts with the park's most popular summertime use by humans.
- Geese prefer fertilized lawns to unfertilized ones and graze on the young grass shoots.
- Goose management programs to reduce the size of local flocks have been initiated at numerous sites in the Bay Area.

"Need to separate feeding and bird congregation areas from public paths where everybody walks." -Community Member commenting on geese at Lake Merritt in October 2001.

Letter
B17
attach.

Lake Merritt Site Conditions

- Studies have shown that geese excrete 10,000,000 fecal coliform bacteria per day. A total coliform count of 170,000 (unit unknown) was recorded near the bird islands in April, 2000.
- Open grass lawns near lake edge are populated with geese.
- Gatherings of 2-200+ geese are common.
- Fecal material covers all lawn areas inhabited by geese.
- Playground near Rotary nature Center has extensive fecal material.
- Accumulation of feathers is visible in the shallow water.
- Visitors feed and greatly enjoy the presence of geese.
- Nesting areas on the lake's shore are few- Geese are opportunists and will find small, protected spots in man made structures or high use areas. Natural lake edges like bluff segments in Lakeside may be used. Most successful nesting occurs on the refuge islands.
- Goslings appear on lake with adults during April.

Goose Habitat Conditions in Park

- Geese prefer open grassy areas where they feed on new grass growth.
- They tend to prefer park areas that are near or in sight of the lake.
- Geese require fresh water and congregate in areas of wet grass where available.
- Geese avoid areas frequented by dogs.

Goose Management Recommendations

Limit goose access in areas extensively used by people. This should be accomplished by:

- Initiating a Goose Management Study to determine the best practice techniques for reducing the impacts of geese on themselves, vegetation, other wildlife, and recreational users. This may involve commencement of a trial use of commercial Goose-Buster service to prevent geese from congregating in designated recreation areas during the summer.
- Creating a zone within Lakeside Park (Free and Open Space Zone) that emphasizes unimpeded use of lawn areas for informal recreation without disruption by goose fecal material.
- Eliminate the feeding of geese by park visitors.
- Reduction of grass and replacement with vegetative cover to that prevents grazing by geese in designated areas; increasing mowing height elsewhere.
- Establishment of vegetative visual and flight barriers to discourage geese from congregating in designated areas.
- Allowing on-sidewalk leashed dog walking per city park code.

Letter
B17
attach.

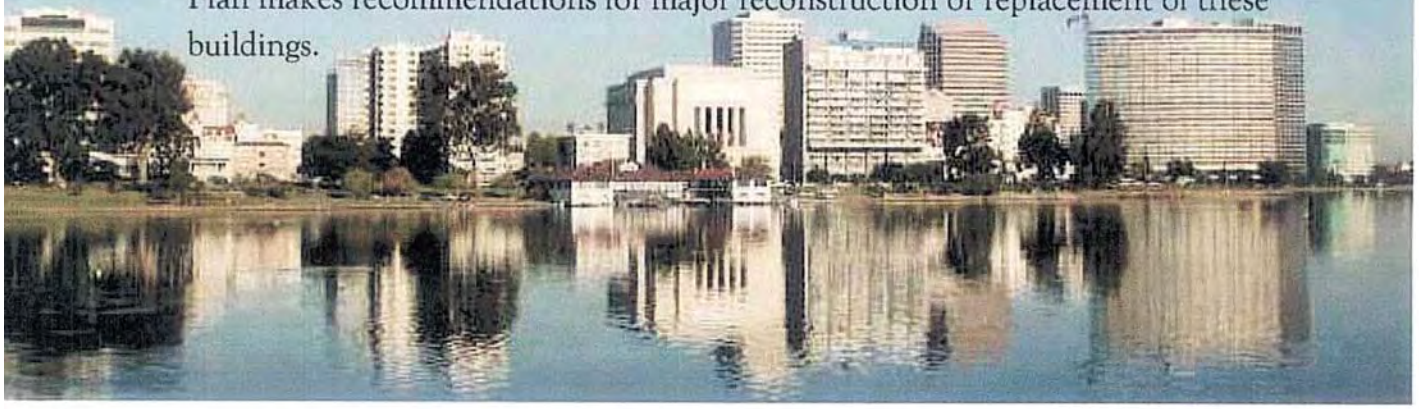
BUILDINGS

General Architectural Background

The buildings of Lake Merritt have evolved over a ninety year span, from the Municipal Boat House (originally constructed as the high-pressure salt water pumping station), to the recent Police Horse Stables. Understandably, there is a wide variety of styles, materials, scales, methods of construction, etc. in the architecture.

The buildings included in this study can be divided generally into two categories based on era of construction. The first era includes buildings constructed between 1909 and 1926: specifically, the Municipal Boat House, the Sailboat House, and the Lawn Bowling Clubhouse (and related outbuildings). The second era includes buildings originally constructed in the 1950's; the Rotary Nature Center, the Lakeside Park Garden Center, and the building which houses the Junior Center of Art and Science.

It should be noted that the Sailboat House and the Junior Center of Art and Science building have had major alterations during their history. in the case of the Sailboat House, the remodel has completley altered its appearance. The Master Plan makes recommendations for major reconstruction or replacement of these buildings.



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Extents of Study

The Lake Merritt Master Plan focuses on exterior form and appearance of existing buildings and makes suggestions for future construction. The eleven buildings included in this study are:

1. Municipal Boat House
2. Municipal Boat House Restrooms
3. Sailboat House
4. Sailboat House Restrooms
5. Sailboat House Storage
6. Lawn Bowling Clubhouse
7. Lakeside Park Garden Center
8. Rotary Nature Center
9. Junior Center of Art & Science
10. Police Horse Stables
11. Snack Bar

There are other significant buildings and structures in and around the Park which should be evaluated and be involved in any discussion of architectural character of the Park's structures. Specifically, these are:

12. Camron Stanford House
13. Glen Echo Pump House
14. Glen Echo Restrooms
15. Edoff Bandstand
16. Garden Center Restrooms
17. Corporation Yard
18. Gréenhouse and Lath house
19. McElroy Fountain
20. Geodesic Dome
21. El Embarcadero Landing Pergola
22. El Embarcadero Library
23. Library Restrooms
24. Pine Knoll Restrooms
25. Fire Alarm Building
26. Snow Park Restrooms

Letter
B17
attach.

BUILDINGS

Figure III.27 Buildings

Letter
B17
attach.

Architectural Goals and General Recommendations

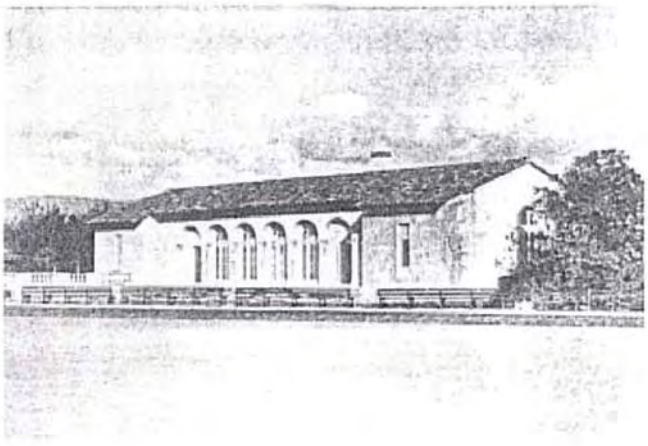
The Lake Merritt Master Plan makes four types of recommendations for the buildings included in the study.

1. Buildings to be revived/restored
2. Buildings to be rehabilitated/reconfigured
3. Buildings to be removed or relocated
4. New buildings

Buildings to be revived and restored include the Municipal Boathouse, and the Lawn Bowling Clubhouse. These are two of the defining buildings of Lake Merritt Park. They possess many inherent qualities which should be revived and encouraged. Restoration should be performed to the U.S. Secretary of the Interior's standards. Additions of poor quality should be removed or reconfigured in a manner which is sympathetic to the building's character, yet readily identifiable to avoid false historicism.

Buildings to be rehabilitated and reconfigured include the Sailboat House and the Lakeside Park Garden Center. While the Sailboat House will require major work to uncover the original character of the 1915 building, and integrate it with the site, the Lakeside Park Garden Center can be improved with a handful of discreet projects in key areas. The bulk of the building should remain intact.

Buildings which are intrusive, and detract from the Park should be removed or relocated. Two buildings which should be removed from the Park are the Police Horse Stables and the Snack Bar. A third, the building which houses the Junior Center of Art and Science (JCAS) should eventually, also be removed. A new building should be constructed to house the Junior Center of Art and Science, allowing the programs that this non-profit group offers to operate without interruption. This new building could also provide space to other educational programs and serve as a police sub station. In the interim, minor renovations to the existing JCAS building that improve its function and relate it to the park improvements are recommended



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BUILDINGS

General Building Recommendations

General architectural goals for new and existing buildings include:

1. To strengthen the relationship of the buildings to the landscape, using the buildings to help define outdoor spaces.
2. To strengthen the relationship between buildings by enhancing or introducing vistas, axes, etc.
3. To preserve key views and vistas around the Lake, and reinforce or establish view corridors where appropriate.
4. To enhance the sense of entry into the buildings.
5. To engage public interest with the buildings and invite interaction with the architecture, through introduction of courtyards, verandas etc.
6. To locate possible new buildings within the park, with the stipulation that there be no net increase to the overall ground coverage by buildings.
7. To provide a unified design theme for the two building types and new structures, this may take the form of materials, color palette, form, orientation, siting, etc.
8. To clearly identify building use through a unified signage program and where applicable, through use of materials, forms, and artistry.
9. To incorporate sustainable architecture, including use of recycled and environmentally friendly materials and methods.
10. To encourage passive systems for energy conservation wherever possible, and active systems, such as solar panels where not.
11. To provide accessibility to all buildings for people with disabilities.

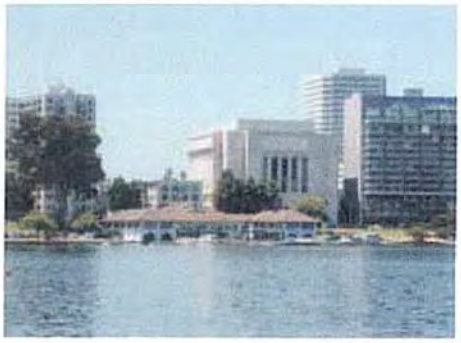
Letter
B17
attach.

Specific Recommendations for Future Buildings

1. Buildings should be of a civic scale, with monumental presence.
2. Architectural materials should be durable and solid, such as concrete or stone, to suggest permanence.
3. No new building should be more than two stories tall.
4. Accessory or secondary buildings should not overshadow or obscure primary park buildings.
5. New buildings should be sited on major circulation routes, as defined by the Master Plan.
6. Park buildings should be integrated into the landscape.

Opportunities for Future Study

While the Master Plan does include façade improvement studies for existing buildings and thematic standards for future buildings, additional examination of the buildings should be performed as part of a complete study. This work might include seismic/structural, planning/use, mechanical/plumbing/electrical systems, hazardous materials, and accessibility compliance studies.



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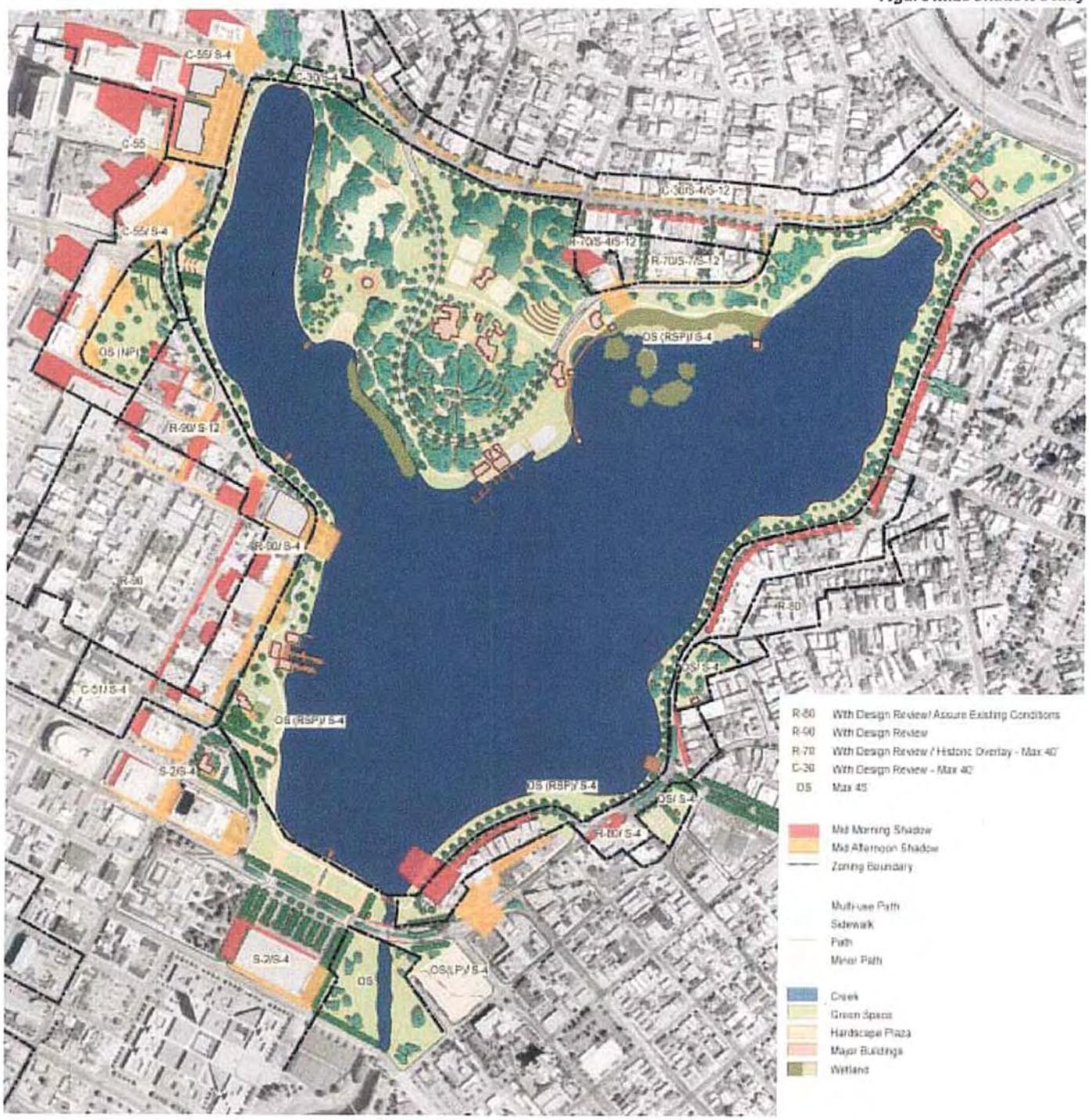
SHADOW STUDY

Figure III.28 Shadow Study



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Sunlight Access and Shadow Study

Tall buildings are located on the perimeter of the Lake casting deep shadows into the parkland. This is problematic in that it reduces solar access for park users and disrupts the normal growing conditions for park vegetation. Furthermore, the imbalance of scale presented by these masses creates an uncomfortable sensory condition for those using the lawns, pathways, and benches nearby. This is further described in the Landscape section of this chapter though the use of panoramic photographs. The public has expressed concern for the negative impact of such structures, often characterizing the feeling as being "walled in." While the Master Plan presents no formal policy to non-park land use and massing, the effects are stated below. General recommendations are also stated to educate planners of future area buildings. No visual preference survey was completed during the planning process, however much public comment was received to substantiate this discussion.

Existing Conditions

- Buildings that cast continuous shade on the park (including Snow Park) for more than several hours each day negatively impacts vegetation growth.
- The blockage of afternoon/evening sunlight provides further negative impacts to park use and enjoyment.
- Groups of buildings form a continuous mass that can further block sunlight from reaching the park.
- Tall buildings (20+) floors standing alone are visually distracting when viewed from a distance (such as the several residential towers built around the Lake in the 1960's and 70's) .
- Four to twelve story residential buildings that have greater façade articulation and tall trees in the foreground generally provide a positive atmosphere. Examples of these are found on Lakeside near Snow Park and on Lakeshore Avenue.
- The view of tall buildings on the downtown edge are generally more scenic when viewed from across the lake as opposed to from the Downtown Park Edge due to the more comfortable scale relationship between people and buildings afforded at that distance.
- If heights were maximized per allowable zoning, the shade on park areas would be great (refer to figure III. on the facing page). Design review is required in most zoning areas of significant height.

General Recommendations

- New buildings should minimize interruption of sunlight into the Park.
- District zoning, design guidelines, and FAR regulations should consider building mass impact to park scale and sunlight access.
- Buildings should accommodate ample room for tall tree plantings in the foreground and along the street.
- The design review process required by most adjacent zoning should consider sunlight access and building mass impacts to the park and its users.
- The placement of new buildings should consider views to popular landmarks from the Lake Merritt park areas. These could include the County Courthouse, the Kaiser Convention Center, the Oakland Hills, St. Paul's Church, the Tribune Building, and others of visual importance.

Letter
B17
attach.

ART ELEMENT

The Lake Merritt Master Plan supports the City of Oakland's commitment to weaving arts and culture into the fabric of everyday life. Public art as an "element" of the park master plan maintains an openness of application. The art may include, singly produced objects, functional designs, a process of creation and collaboration, or an overall approach and design of a place. The art may be the product of individual artists' creativity or the result of collaboration between artists of different disciplines, designers, architects, and community members. The resulting condition can be a landscape of meaning and visual intrigue.

Through "Spotlight on the Arts", the Craft and Cultural Arts Department is seeking to establish Oakland as the center for artistic-cultural events and entertainment in the Bay Area. From downtown renaissance projects to the restoration of Lake Merritt, the opportunities to promote arts and culture are found throughout our city.

The LMMP recognizes opportunities for artists to reflect the unique environment, culture and social conditions of Oakland, its neighborhoods, history, natural resources, and people. The intent of the art element is to describe the many opportunities for integrating arts into the revitalization of the park. No specific projects are determined, nor is a single arts approach recommended. Rather, the master plan sets the thematic and programmatic content of the Lake Merritt Park art element. The plan then acts as a guide to shape the artistic exploration of concepts and projects as part of the art element. This chapter describes the opportunities and highlights the guidelines.

Letter
B17
attach.

Opportunities

Art Element Overview

Environmental Art

Natural conditions/processes should be recognized as a basis for site design and restoration. The landscape -more specifically, the art element-should integrate ecology as a function of the park and provide a means of its interpretation. Suitable locations for this type of expression could include the shoreline restoration in Lakeside Park; creek daylighting in Eastshore Park; other creek nodes, bird perches, storm drain filter covers, etc.

Designed Elements

Artists and craftspeople should be included to provide aesthetic input on functional elements in the park. Elements could include railings, fences, docks, botanical garden entries and perimeter fencing, neighborhood nodes (paving, seatwalls); historic markers and signage, entire promenades, low retaining walls, sections of the perimeter path, etc.

Collaborative Design Process

Many successfully designed and built projects are the result of collaborations between artists and designers. The process requires the partnership and collaboration of minds to conceive and execute such a work. Such an effort obscures the line between landscape and art, between meaning and aesthetic. Any improvement project is applicable to this process including zones or spaces within the park; entrances, nodes, and gateways; buildings recommended for restoration, remodeling or new construction; and park amenities.

Environment for Display

In addition to the incorporation of art as a design process, the lake and park offers a unique setting for the display of permanent and temporary sculptural work. The civic district of the park- stretching from 14th Street to the Estuary- is a potential area for sculpture display. Specific sites include the new 12th Street park area, the Fire Alarm Building Site, and the plaza at the 14th Street terminus. The Oakland Museum is recognized as a potential partner in the sculpture component and arts zone overlay.

Letter
B17
attach.

ART ELEMENT

Ecology

The art element should reinforce the park's ecological heritage and potential. By highlighting the creeks, watershed, habitat zones, and natural systems, the story of ecology can be made evident.

Education

An understanding of natural processes, horticultural diversity, cultural heritage, and the history of Lake Merritt can be reinforced through the application of the art element. The plan describes several methods for application under Opportunities.

Recreation

The park is used by many as a place for recreation. Provisions for these movements could be explored through the art element. For example, park amenities such as benches, signs, or walls, could combine exercise functions into their design; pathways could mark the pace or distance traveled of a jogger. The components could be artistically designed to serve a multipurpose role in the park.

Culture

Culture is an underlying theme to all aspects of the master plan. Oakland's urban form, social composition, ecology, history, and present activities each shape the notion of local culture. The art element can reflect the unique character of Oakland, its peoples, neighborhoods, built form, history, and natural environment.

Letter
B17
attach.

Art Element Recommendations

- The art element should be compatible with and enhance ecology/resource sensitivity.
- The art element should enhance the historic, cultural, aesthetic, and interpretive potential of the park and support the park program and management per the master plan and the department of Parks and Recreation.
- The art element should conform to applicable design guidelines for functional park elements, while enhancing the aesthetic and educational possibilities of these necessary amenities.
- The art element should consider maintenance requirements and minimize the need for specialized practices.

LETTER B17
John Wilson
September 11, 2007

Response B17-1: The Lake Merritt Master Plan was considered in developing the proposed project design and is described on page 94 of the Draft EIR. A section of the plan is attached to the comment letter. The Measure DD-funded activities would address many of the goals identified in the Master Plan, including the forestry, water quality, and architectural recommendations included in the section submitted with the comment. Chapter V, Alternatives, of the Draft EIR describes a "lid park" alternative for the 12th Street roadway construction, which was evaluated as part of the Lake Merritt Master Plan. As stated on page 348 of the Draft EIR, this alternative was identified as undesirable by community members and the design team due to several factors including: no direct estuary pedestrian connections were possible; tidal flow was not improved from the current conditions; the structure would not enhance shoreline access; and the cost to build the structure was not justified by the benefits. As such, this alternative was not evaluated in the Draft EIR.

Letter
B18

From: notify@yahoogroups.com on behalf of eliseackerman
[eliseackerman@yahoo.com]
Sent: Tuesday, September 11, 2007 3:05 PM
To: Thornton, Elois
Subject: EIR for Measure DD

Hi there,

Please take a look at the intersection of Harrison Street, Bay Place and 27th Street. It is already an extremely dangerous intersection with an accident or a close call happening about once a week. The Whole Foods that will open at the end of the month will exacerbate the problem. **1**

One block up the road, where Orange merges into Harrison, is also extremely dangerous. Motorists are confused by the configuration of the islands and drive down the wrong side of the street several times a day. **2**

Elise Ackerman
306 Oakland Avenue

LETTER B18
Elise Ackerman
September 11, 2007

Response B18-1: The 27th Street/Bay Place/Harrison Street intersection was evaluated in Section IV.C, Transportation Circulation and Parking of the Draft EIR. The text on page 115 of the Draft EIR notes that under existing conditions this intersection operates at LOS F during the AM peak hour. The text on page 124 of the Draft EIR (Impact TRANS-4) notes that implementation of the Lake Merritt and Lake Merritt Channel project components would result in significant impacts at this intersection, under the existing plus project conditions. The average vehicle delay at the 27th Street/Bay Place/Harrison Street intersection would increase by 4.6 seconds during the AM peak hour. Mitigation Measure TRANS-4 in the Draft EIR recommends optimizing the signal timing at this intersection to reduce the total intersection average vehicle delay by 49.9 seconds during the AM peak hour. Although with mitigation the intersection would remain at LOS F, it would operate at a total average vehicle delay that would be 45.3 seconds lower than the delay with no project and no mitigation. The increased delay and decreased LOS would not increase the hazard at the intersection – reduced traffic speeds would lower the safety risk at the intersection. It is also noted in the Draft EIR that under cumulative conditions, the proposed project would have a less-than-significant impact on this intersection (see page 134).

Response B18-2: The intersection identified in the comment is not part of the project area.

Letter
B19

From: Barton Mayhew [bmayhew03@yahoo.com]
Sent: Tuesday, September 11, 2007 1:38 PM
To: Thornton, Elois
Cc: harrioak@yahoogroups.com; rbishop747@aol.com
Subject: Measure DD draft EIR Comments

Ms. Thornton: I am responding to the "Measure DD draft EIR" affecting the intersections and crosswalks around, nearby, and/or adjacent to Harrison Street, Bay Place, and 27th Street. Due consideration needs to be included regarding pedestrians and cyclists, and vehicle traffic configurations on and near these public streets, and walkways. Safety for pedestrians and cyclists especially needs to be emphasized first and foremost. Any changes in design, construction, or installation of controls should benefit people on foot or bicycle over and above vehicle movement. In other words, pedestrians and cyclists should be the primary concern for environmental impact alterations. Restrictions on vehicles, and provision for pedestrians and cyclists is mandated by state and local laws. Please apply highest standards for residents and visitors to this area of Oakland. **1**

Barton Mayhew, on behalf of traffic safety committees, Harrioak Neighborhood Association, and Westlake Community Coalition

LETTER B19
Barton Mayhew
September 11, 2007

Response B19-1: The design of the 27th Street/Bay Place/Harrison Street intersection is not part of the proposed project. Impacts to the intersection resulting from implementation of the proposed project are discussed in Section IV.C, Transportation Circulation and Parking of the Draft EIR. See response to comment B18-1 for the identification of level of service operation at the 27th Street/Bay Place/Harrison Street intersection.

As stated on page 139 of the Draft EIR, the Lake Merritt and Lake Merritt Channel group would not conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation. The project is consistent with the adopted Oakland Bicycle Master Plan (see Figure IV.C-5 of the Draft EIR for the most recent update) and Pedestrian Master Plan. It would improve bikeway connectivity and pedestrian access around Lake Merritt and along the Lake Merritt Channel and would complete linkages along the Oakland waterfront. No impacts to pedestrian or bicyclist safety were identified in the Draft EIR at the 27th Street/Bay Place/Harrison Street intersection under the City's significant criteria for the evaluation of environmental impacts.

Letter
B20

From: Catherine McBride [cmcbride@pacbell.net]
Sent: Tuesday, September 11, 2007 5:07 PM
To: Thornton, Elois
Subject: Fw: Measure DD EIR comments
Hi - don't know how these got dated 10-11 at 3:54 but I sent them today, 9-11, at 3:54 in hopes of making the deadline. Sorry and thanks - Catherine McBride

1

----- Original Message -----
From: Catherine McBride
To: Eathornton@oaklandnet.com
Sent: Thursday, October 11, 2007 3:54 PM
Subject: Measure DD EIR comments

Re: Harrison Street/Bay Place/27th Street traffic and Whole Foods impact on Measure DD.

A traffic test on use of the Whole Foods (WFs) loading dock, attended by neighborhood residents, WFs management staff, truck company management, and city staff and planners proved that:

1) WFs semi-trucks (even larger trucks are planned for future use) block the Harrison Street sidewalk and pedestrian traffic when using the loading bay and turning in/out of WFs.

2) WFs semi-trucks extend onto Harrison Street by several inches when using the loading bay.

2

3) The Harrison Street sidewalk parallel to WFs is extremely narrow even when accessible to pedestrians.

4) WFs trucks entering/exiting the loading bay cause traffic back-ups which stop traffic on Harrison Street in both directions since traffic must be stopped on all of Harrison to allow for the difficult maneuvering of large trucks into/out of the loading bay. WFs semi-trucks will be using the loading bay during drive time peaks due to municipal delivery time restrictions.

5) The are thousands of seniors who live in St. Paul's Towers, in the 4 apartment buildings located near Broadway/27th, the Downtown Senior Center located in the Veteran's Memorial Building - and no changes have been made to traffic safety islands, timing of crosswalk lights, or any other "slow pedestrian" safety needs. Family use these same streets and crosswalks when using the Lake Merritt facilities.

3

In summary, the opening of Whole Foods at the end of this month; the increased development of residential condos on Broadway; the high population of senior citizens; the development of the new cathedral; the expansion and development of Kaiser medical services; and the possible and DREADED development of lakeside condos (NO, NO!) when considered with Measure DD changes make for massive traffic problems for the Harrison Street/Oakland Avenue corridor that been in no way addressed or resolved in an integrated manner.

4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20

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Subject: Measure DD EIR comments

Re: Harrison Street/Bay Place/27th Street traffic and Whole Foods impact on Measure DD.

A traffic test on use of the Whole Foods (WFs) loading dock, attended by neighborhood residents, WFs management staff, truck company management, and city staff and planners proved that:

1) WFs semi-trucks (even larger trucks are planned for future use) block the Harrison Street sidewalk and pedestrian traffic when using the loading bay and turning in/out of WFs.

2) WFs semi-trucks extend onto Harrison Street by several inches when using the loading bay.

2

3) The Harrison Street sidewalk parallel to WFs is extremely narrow even when accessible to pedestrians.

4) WFs trucks entering/exiting the loading bay cause traffic back-ups which stop traffic on Harrison Street in both directions since traffic must be stopped on all of Harrison to allow for the difficult maneuvering of large trucks into/out of the loading bay. WFs semi-trucks will be using the loading bay during drive time peaks due to municipal delivery time restrictions.

5) The are thousands of seniors who live in St. Paul's Towers, in the 4 apartment buildings located near Broadway/27th, the Downtown Senior Center located in the Veteran's Memorial Building - and no changes have been made to traffic safety islands, timing of crosswalk lights, or any other "slow pedestrian" safety needs. Family use these same streets and crosswalks when using the Lake Merritt facilities.

3

In summary, the opening of Whole Foods at the end of this month; the increased development of residential condos on Broadway; the high population of senior citizens; the development of the new cathedral; the expansion and development of Kaiser medical services; and the possible and DREADED development of lakeside condos (NO, NO!) when considered with Measure DD changes make for massive traffic problems for the Harrison Street/Oakland Avenue corridor that been in no way addressed or resolved in an integrated manner.

4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20
cont.

Coalition, I submit these comments. I do not speak for these groups but we have struggle with these issue over many years.

Thank you,

Catherine McBride
242 Frisbie Street
Oakland, CA
94611
510-465-6605
District Three

LETTER B20
Catherine McBride
September 11, 2007

Response B20-1: This introductory comment, which states the correct date of comment submission, is noted. The comments submitted were received in time and are considered in this Response to Comments Document.

Response B20-2: The comment provides an opinion of traffic hazards at the 27th Street/Bay Place/Harrison Street intersection associated with the Whole Foods project and is noted. Also see Response to Comment B18-1.

Response B20-3: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response B20-4: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted.

Letter
B21

Inlandboatmen's Union of the Pacific
MARINE DIVISION -- INTERNATIONAL LONGSHORE & WAREHOUSE UNION
NATIONAL OFFICE • 1711 W. NICKERSON ST., STE D • SEATTLE, WA 98119 • (206) 284-6001 • FAX (206) 284-5043

San Francisco Regional Office 450 Harrison Street, San Francisco, CA 94105 415-896-1224
FAX: 415-896-1226

FAX COVER SHEET

6538

TO: Elois A Thornton FAX: 510-238-~~3944~~

Planner IV DATE: 9-5-07

City of Oakland - Comm + Econ Dev. Agency

FROM: **Marina V. Secchitano, Regional Director**

RE: Opposed to pedestrian walkway on Bridge faces

Number of pages including cover sheet: _____

Message: Our Captains are very concerned about the safety of this proposal.

Please see letter attached —

Marina V Secchitano

1

2

REGIONAL OFFICES

PUGET SOUND
W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5040
FAX (206) 284-5043

REGION 37
1711 W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5321
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COLUMBIA RIVER
2435 NW Front Ave
Portland, OR 97209
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FAX (503) 223-2556

SAN FRANCISCO
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San Francisco, CA 94105
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FAX (415) 896-1226

HAWAII
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Honolulu, HI 96817
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FAX (808) 847-9051

SOUTHERN CALIFORNIA
1911 N. Gaffey, Ste. A+B
San Pedro, CA 90731
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KETCHIKAN
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Ketchikan, AK 99901
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FAX (907) 225-8656

JUNEAU
3017 Clinton Drive, Ste 201
Juneau, AK 99801
(907) 790-9544
FAX (907) 790-9545

Letter
B21
cont.

NORTHERN CALIFORNIA DISTRICT COUNCIL – ILWU

1188 FRANKLIN STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 775-0533

AFFILIATED
ILWU LOCAL UNIONS:

Local 6 Warehousemen:
San Francisco
Stockton
Oakland
Redwood City San Jose
Crockett Richmond
Salinas

Local 10 Longshore
San Francisco

Local 14 Longshore
Eureka

Local 17 Warehouse
Broderick

Local 18 Longshore
West Sacramento

Local 34 Shipclerks
San Francisco

Local 54 Longshore
Stockton

Local 75 Watchmen
San Francisco

Local 91 Walking Bosses
San Francisco

IBU Marine Division
San Francisco

September 5, 2007

Attention: City of Oakland Planning Commission:

We have reviewed your Draft Environmental Impact Report and are very supportive of the overall intent of the project. A waterfront trail is a positive way for the community to access the waterfront and all its unique activities. **3**

Extending the Waterfront Trail around the bridge faces into navigable waterways would interfere with maritime activities. Both the Park Street Bridge and the High Street Bridge are narrow and congested with other vessel traffic, recreational boaters, etc. Currently, all the space available is needed to ensure that the commercial vessel maneuvers can be performed safely. We believe this portion of the plan is a conflict with Policy W2.6, as it unnecessarily endangers public safety, as well as interfering with maritime activities.

Some of our ILWU Captains have over 30 years experience on this route delivering sand and gravel to the Hanson Yard under all kinds of conditions and feel strongly that the implementation this part of the plan would jeopardize the safe transit of their tugs and barges through the bridges. **4**

Waterborne transit is an environmental friendly way to move products, and it reduces the amount of trucks necessary on the roadways. To replicate the volume of aggregate being delivered would result in thousands of truck transits a year added to the Bay Bridge and the community. The ILWU has been working in a partnership with the Oakland community to improve the air quality. While we support the Waterfront Trail, we ask that the City work to make sure that our navigational waterway is not impeded by the incursion of the pedestrian trail around the bridges.

In closing, we note that there are many good union jobs at stake. If it is necessary to close this facility we deliver to because we can't safely get through the bridges, this will result in the loss of many good union jobs with health care for our families and good pensions. **5**

Please redraft this part of the plan regarding the Waterfront Trail. **6**

Sincerely,

Marina V. Secchitano
Vice President

MVS/lk
cwa39521

LETTER B21
Inlandboatmen's Union of the Pacific
Marina V. Secchitano, Vice President
September 5, 2007

Response B21-1: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-2: The comment, which expresses concern with the safety of the proposed project, is noted. Refer to Response to Comment A8-1.

Response B21-3: The comment, which expresses support for the proposed project, is noted.

Response B21-4: Refer to Response to Comment A8-1.

Response B21-5: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-6: Refer to Response to Comment A8-1.

Letter
B22

From: Bishop, Mike (Oakland) NA [Mike.Bishop@hanson.biz]
Sent: Monday, September 10, 2007 10:25 PM
To: Thornton, Elois
Subject: Measure DD Draft EIR
Please see attached comments to Measure DD Draft EIR.

Mike Bishop
Marine Operations Manager
Northern California
Hanson Aggregates
(510) 261-8573

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates
4501 Tidewater Avenue
Oakland CA 94601
Tel. 510 261-8533
Fax. 510 534-7418

September 10, 2007

Attention: City of Oakland Planning Commission

Subject: Draft EIR for Implementation of Measure DD projects – Oakland Waterfront Trail and Access Improvements

Lack of Public Out-reach:

- Hanson is in favor of the concept of creating public access to the waterfront and has been involved in the process over the last 3 years. That said the public out-reach for this EIR has been very limited, as a stakeholder and a participant we have had very little contact with the process over the last two years. The scope of the project was brought to our attention by the US Coast Guard and that was by the time the EIR project was well underway. There was no notification of the scoping meeting received for stakeholders. There was no invitation to comment or participate during the EIR process. This Draft EIR encompasses a huge scope and I do not believe the out reach to the public has been very encompassing to alert the public of the impacts of these projects. **1**

Group 2 Alternatives – Waterfront Trail Surface Street Connection Alternative (Group2)

- This alternative failed to mention that eliminating the boardwalks under the bridges, specifically the High St Bridge and the Park St Bridge would also reduce the impacts to navigation under these bridges. Reducing the navigational channel under these bridges may severely impact current and future barge traffic that currently use the estuary. This point was not address in this Draft EIR. **2**

Table II-1: Summary of Impacts and Mitigation Measures – A. Land Use (Group2)

- This Draft EIR does address the need for safe access along the waterfront on the Hanson Aggregates lease. What it has omitted is how complex this issue is. In preliminary meetings in 2004 several designs and discussions were considered as to how the Bay Trail may safely access the working waterfront site at Hanson. There was no conclusion drawn at that time and the one proposed in this Draft EIR is far from adequate. Discussed at that time was the overall poor condition of the concrete pier in which the path would be on as the path crossed the Hanson lease, the Draft EIR does not address this issue. It does not address the impacts the trail would have on the barge unloading operations at this location either. **3**

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

As stated Hanson Aggregates is in favor of the Bay Trail and conceptually routing it over property that is leased. These comments are to address the omissions in the Draft EIR in regards to the impacts on our environment, operations and business as they are today. 4

Regards,

Mike Bishop
Marine Operations Manger
Hanson Aggregates

LETTER B22
Hanson Aggregates
Mike Bishop, Marine Operations Manager
September 10, 2007

Response B22-1: Refer to Response to Comment B4-1 for a general description of the process that was used to notice the Draft EIR. In addition, Joel Peter, Program Manager for the Measure DD Project, e-mailed Mr. Hanson on August 10, 2007 to notify him of the availability of the Draft EIR.

Response B22-2: The comment correctly states that the proposed Waterfront Trail Alternative notes that eliminating the boardwalks under the bridges would also reduce the impacts to navigation under these bridges. While the City did not find the impedance of marine shipping to be a significant effect under the City's significance criteria (Refer to Response to Comment A8-1), the City recognizes that the U.S. Coast Guard and the marine shipping community oppose the undercrossings of the bridges on the Oakland Channel and that the U.S. Coast Guard might not be willing to issue a permit for the proposed undercrossings. The text on page 357 of the Draft EIR is revised as follows:

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree than the proposed project. All objectives for the Lake Merritt and Lake Merritt Channel, the Recreational Facilities, and the City-Wide Creeks Groups would be met. <u>It is being considered, in part, because the U.S. Coast Guard and the marine shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail and because the U.S. Coast Guard has permitting authority in this area.</u> The alternative would complete the missing segments of the San Francisco Bay Trail along the Oakland Estuary, albeit with segments that would not be constructed on the waterfront but rather on nearby streets. Because the trail would avoid contaminated properties, hazardous waste impacts associated with these properties would not occur but the properties would also not be remediated, one of the objectives of this project group. The alternative would support some of the objectives of OSCAR and the Estuary Policy Plan by completing a linear trail along the waterfront; however because the segments would be completed away from the shoreline in some cases, the alternative would not create as much physical and visual access to the Oakland shoreline as the proposed project.

Response B22-3: On page 57, the Draft EIR acknowledges that crossing the Hanson Aggregate facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time and the text on page 57 of the Draft EIR is revised as follows:

(14) Gallagher & Burk/Hanson Aggregate Trail Connection. The proposed segment of the trail adjacent to the Gallagher & Burk asphalt plant would be a concrete pier supported walkway. As the Hanson Aggregate facility uses water access for delivery of materials, the trail would be designed to allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail. Property easements are being sought for this segment of the trail, but operational constraints may preclude completing this segment of the trail while the facility is in operation. An interim route may include a connection to Tidewater Avenue, which is analyzed in the Section V, Alternatives.

Response B22-4 The comment, which pertains to the merits of the project, is noted.

Letter
B23

GALLAGHER & BURK INC.
PAVING GRADING
OAKLAND, CALIFORNIA

LETTER OF TRANSMITTAL

344 High Street Oakland, CA 94601
Tel. 925-829-1446 Fax 925-829-8174

TO: City of Oakland
Community & Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza
Suite 3315
Oakland, CA 94612

Attn.: Elois A. Thornton

DATE	JOB NO.
08/27/07	

RE: City of Oakland Measure DD

WE ARE SENDING YOU: ☒ Attached ☐ under separate cover via: _____ the following items;

☐ Quote ☐ Specifications ☐ Plans ☐ Insurance Requirements ☐ Samples
☐ Change Order ☐ Copy of Letter ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	08/22/07	1	Comments regarding the City of Oakland Measure DD
			Implementation Project, Environmental Impact Report

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO Bob McCarrick
File No. 58004 Pedestrian Trail

SIGNED: Vicki Duma

If enclosures are not as noted, kindly notify us at once.

Letter
B23
cont.

GALLAGHER & BURK, INC.
PAVING & GRADING CONTRACTORS LICENSE NO. 141140A
344 HIGH STREET • P.O. BOX 7227 • OAKLAND, CALIFORNIA 94601
(510) 261-0466 • FAX (510) 261-0478

August 22, 2007

Subject: City of Oakland Measure DD
Implementation Project
Environmental Impact Report
State Clearinghouse #2006122048
Public Review Draft
Prepared by LSA dated July, 2007

To Whom It May Concern:

Gallagher and Burk has been a major contractor and employer in the City of Oakland since 1946, with offices at 344 High Street. Our asphalt concrete plant, located at our Tidewater address serves the infrastructure maintenance needs of the greater Oakland area, including the Port of Oakland's maritime and airport facilities.

We have reviewed a copy of the above referenced document and have concerns about the logistics and safety aspects of combining public access with industrial activities. As traffic and air quality issues become an increasing concern, we expect to supply the raw materials to our asphalt plant by water access. Paragraph 14 "Gallagher & Burk/Hanson Aggregate Trail Connection" on page 57, describes the adjacent trail being installed as a concrete supported walkway. The intent is to "allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail."

1

It is unclear to us how safety and access will be controlled. It is likely that we will be burdened with extraordinary costs of equipment and operations due to the issues related to public access. We request that these issues be addressed, including controls of public access and reimbursement of additional costs that our facility will incur.

We look forward to your attention to these matters, which are of grave concern to the long-term operation of our facility. If you have any questions or need additional information, please contact me.

Very truly,

Alan French
General Manager
Gallagher & Burk Materials Division

cc: Bob McCarrick

LETTER B23
Gallagher & Burk Materials Division
Alan French, General Manager
August 22, 2007

Response B23-1: Economic impacts (either at the "macro" level of the City, or at the "micro" level of the individual private business) do not fall under the definition of environmental impacts in CEQA and therefore are not discussed in detail in the Draft EIR. The Draft EIR correctly focuses on the physical effects of the project, which include land use conflicts and safety. These effects are discussed on page 81 of the Draft EIR and mitigation is proposed that would reduce the effects of the project to less-than-significant levels. Nevertheless, on page 57, the Draft EIR acknowledges that crossing the Gallagher & Burk facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time. Refer to Responses to Comment A8-1, B22-2, and B22-3.

Letter
B24

From: JSASAY@up.com
Sent: Monday, September 10, 2007 3:32 PM
To: Thornton, Elois
Subject: Comments on Lake Merritt Channel Measure DD DEIR

I am attaching Union Pacific Railroad Company's letter with comments concerning the Draft Environmental Impact Report.

(See attached file: Lake Merritt DEIR Comment Letter.pdf)

****

Jeff S. Asay
Senior Counsel - Western Region
Union Pacific Railroad
10031 Foothills Blvd., Suite 200
Roseville, CA 95747
(916)-789-6217.

This message and any attachments contain information from Union Pacific which may be confidential and/or privileged.
If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this message is strictly prohibited by law. If you receive this message in error, please contact the sender immediately and delete the message and any attachments.

Letter
B24
cont.

UNION PACIFIC RAILROAD COMPANY

LAW DEPARTMENT
10031 Foothills Boulevard, Suite 200, Roseville California 95747-7101
(916) 789-6400 Facsimile (916) 789-6227

JEFF S. ASAY
Assistant General Solicitor
Direct Line: (916) 789-6217

September 10, 2007

Community and Economic Development Agency
Planning Division
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Attn: Elois A. Thornton, Planner IV
(email: eathornton@oaklandnet.com)

Re: **Measure DD Implementation Project**
Lake Merritt Channel Improvements
Draft Environmental Impact Report
Case No. ER 06-0017

Comments Concerning Draft EIR

Dear Planning Division:

Union Pacific Railroad Company submits the following comments with respect to the Draft Environmental Impact Report identified above dated July 20, 2007.

The DEIR identifies the project boundaries as extending to the Union Pacific Railroad Company right of way and main line on the south end of Lake Merritt Channel. It is not possible from the maps in the DEIR to determine if the boundary encroaches into UPRR's right of way at that location. UPRR strongly objects to any designation of project boundaries that includes our right of way and trackage at this location. UPRR requests that the FEIR state definitely that the project boundary does not encroach on UPRR right of way between the main line and I-880. 1

Letter
B24
cont.

UPRR's right of way at this location contains triple tracks for the main line south and east from central Oakland and the Port of Oakland. This main line handles numerous passenger and freight trains on a daily basis. UPRR must retain the entire width of the right of way at this location for main line trackage and train operation. No part may be released or sold for improvements to Lake Merritt Channel. **2**

Further, UPRR has entered into an agreement with Caltrans relating to the seismic retrofit of Interstate 880 at this location. Pursuant to this agreement, UPRR will construct a third main line track on the north side of its right of way, utilizing available width at this location. The addition of this new third main track will require construction of a new railroad bridge across Lake Merritt Channel matching the elevation of the existing railroad bridges. Therefore, no encroachment of the Lake Merritt Channel on the railroad right of way will be entertained or permitted at this location. **3**

Please revise the DEIR accordingly, noting that project boundaries must not encroach on UPRR right of way and must not extend south of the north right of way line of the UPRR. It should also be noted that further expansion of the Lake Merritt Project south of the railroad must take into account the fact that the location and elevation of the existing and planned railroad bridges. **4**

Please contact the undersigned if more information is needed.

Very truly yours,

Jeff S. Asay

/amm

LETTER B24
Union Pacific Railroad Company
Jeff Asay, Senior Counsel – Western Region
September 10, 2007

Response B24-1: Refer to Response to Comment A7-1.

Response B24-2: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided.

Response B24-3: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided. Refer to Response to Comment A6-1.

Response B24-4: Refer to Response to Comment A7-1.

STEEFEL, LEVITT & WEISS
A Professional Corporation

Letter
B25

September 14, 2007

19869

VIA E-MAIL (*EAThornton@oaklandnet.com*)

Elois A. Thornton, Planner IV
Community and Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza, Ste. 3315
Oakland, CA 94612

Re: Union Pacific Railroad Company's Comments on
Draft EIR for Measure DD Implementation Project, SCH #2006122048

Dear Ms. Thornton:

We represent Union Pacific Railroad Company ("UP"). By this letter, UP augments its letter to you dated September 10, 2007 and further presents its comments on the Draft Environmental Impact Report ("Draft EIR") for the Measure DD Implementation Project (the "Project"). 1

The Project seeks to implement Measure DD, a municipal bond measure passed by Oakland voters in 2002 that authorizes the City of Oakland (the "City") to issue bonds that fund physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreational facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restorative activities. The Project is divided into four implementation groups located throughout the City: (1) Lake Merritt and Lake Merritt Channel Improvements (Group 1); (2) Oakland Waterfront Trail and Access Improvements (Group 2); (3) North and East Oakland Recreational Facilities (Group 3); and (4) City-wide Creeks, Restoration, Preservation and Acquisition (Group 4).

Located adjacent to or otherwise near the Project sites are UP's railroad yard, a railroad line and right-of-way in Oakland (the "UP Line") that roughly parallels the I-880 freeway. As a result of this close proximity, the development or improvements proposed by the Project are likely to impact the UP-Line and rail services. 2

By this letter, UP brings to the City's attention its concerns regarding traffic, safety, trespassing, vibration, and mechanical odor. Based on our comments below, UP respectfully requests that the City analyze these impacts associated with the Project's location near the UP Line and require appropriate mitigation measures to reduce those impacts.

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

1. Background on UP

Many people know about UP's distinguished history. UP played a prominent role in the development of the first transcontinental railroad in the late 1860's. What many people do not know is that today, UP remains a significant owner of railroad property and a major freight transporter in the western two-thirds of the United States. In fact, UP is the largest railroad company in North America.

Of particular relevance to the Project, UP owns a railroad yard, railroad line and right-of-way immediately adjacent to or near the Project sites. UP operates freight services, and Amtrak operates passenger services, on the UP line. The UP line experiences a very high volume of rail traffic, as it serves the entire metropolitan Bay Area and is a major transportation corridor through Northern California. **3**

Given UP's significant presence in and around the City of Oakland, UP takes great interest in the City's growth and improvement. It is with this perspective that UP respectfully submits the comments in this letter.

2. Traffic

Many of the concerns specific to the Project, including, but not limited to, a concern about traffic, arise from the associated increase in population within the close proximity of the UP Main Line. Specifically, the Project proposes, in connection with Group 3, the construction of an East Oakland Sports Complex at the corner of Ednes and Jones Avenues. This component of the project proposes a 150,000 square foot addition to and expansion of the existing Ira Jinkins Park/Recreation Center (the "Center"). (Draft EIR, p. 57.) The facility is anticipated to include a 25-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley.

The UP Line crosses several roadways at-grade to the immediate east of the Center, including, but not limited to, the at-grade crossings at 85th Avenue and 98th Avenue. A natural consequence of the expansion of the Center will likely be an increase in the number of people going there to enjoy the new recreational benefits. In turn, there will also likely be an increase in traffic volumes in and around that area, including the existing at-grade rail crossings. Traffic spillover effects may further increase vehicle trips over the at-grade crossings, as motorists attempt to take short cuts to avoid congestion along primary traffic aterials. Additional vehicle trips and traffic congestion could negatively impact at-grade rail crossings in the area by increasing the chance of train-vehicular conflicts, thereby raising an obvious safety issue. **4**

UP therefore urges the City to further analyze the Project's potential impacts on traffic inasmuch as they relate to rail safety and operations along the length of the right-of-way, and traffic flow at at-grade rail crossings near the proposed East Oakland Sports Complex, including, without limitation, those at 85th Avenue and 98th Avenue. UP's operations must not be affected

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

by greater traffic and potential congestion at at-grade crossings and, thus, adequate mitigation measures should be implemented. Possible mitigation measures include construction at the developer's expense of grade-separated crossings or permanently blocked-off closures of existing at-grade crossings. (For a further discussion on the concern of at-grade crossings, see Section 3 below.)

4 cont.

3. Pedestrian and Bicycle Safety; Trespassing

The addition of this substantial increase in population near the UP Line creates concerns not only about traffic but also about pedestrian and bicycle safety. Planned uses near the UP Line include, without limitation, recreational facilities (*e.g.*, East Oakland Sports Complex, Municipal Boathouse), parks, pedestrian and bicycle trails (*e.g.*, Waterfront Trail along the Oakland Estuary between Jack London Square and 66th Avenue), marina uses, residential, open space, roadways, and retail/commercial. Although this area is already populated, these developments and improvements will likely attract a substantially large amount of people the immediate vicinity of the UP Line, thereby raising concerns about pedestrian and bicycle safety, and trespassing.

For instance, the Waterfront Trail will likely attract more pedestrians and cyclists to the area around the UP Line. UP generally disfavors the location of pedestrian trails and uses adjacent to its tracks and therefore any trails or pedestrian uses adjacent to or in close proximity of UP's tracks that are currently under consideration should be highly discouraged. The distance between the trail and the UP Line is anticipated to vary from one point to another. In some places, such as the vicinity of the mouth of the Channel, the trail would be located immediately adjacent to the UP line. Some of those people using the trail could walk across the UP Line to reach the trail at various points, and others might trespass onto the UP right-of-way itself. Similarly, the pedestrian, bicycle, and small boat improvements in connection with the Lake Merritt Channel Improvements likely will increase the number of people who may walk or bike across the UP Line, and/or walk, bike, or boat beneath railroad bridges that span the Lake Merritt Channel, at point close to the mouth of the Channel, and that parallel the automotive bridge on Fruitvale Avenue. These potential impacts raise concerns about pedestrian safety, trespassing and interference with rail operations.

5

The concern about safety is also exacerbated by the Project's proposal to increase the population near existing at-grade crossings, such as, among others, the intersection of Embarcadero and 5th Avenue, at 85th Avenue, and at 98th Avenue. Although the vehicular traffic analysis in the Draft EIR found the Project's traffic impacts on the intersection of Embarcadero and 5th Avenue to be less than significant, the Draft EIR contained no analysis regarding pedestrian and bicycle safety at that intersection, let alone the at-grade crossings at 85th Avenue and 98th Avenue, near the proposed expansion of the Center. Patrons of the Center may walk or jog through and around the surrounding neighborhood, meaning that some likely would walk across the UP Lines at the aforementioned at-grade crossings, or might trespass onto

6

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

the UP right-of-way itself. This increase in pedestrian activity near the UP Line could implicate pedestrian safety around the tracts. **6 cont.**

Another safety concern is the City's stated goal to provide trail access along the Lake Merritt Channel south of 7th Street, which would require the trail to cross the existing UP mainline rail tracks at-grade and/or require a new at-grade crossing along the channel. (DEIR, p. 129.) We note that, any such new at-grade crossings (or modifications to existing crossings) require the permission of the California Public Utilities Commission. Although the Draft EIR states that the "resolution of improving trail connectivity is not intended to be resolved in this study," UP advises in advance that it strongly objects to any proposed at-grade crossings because they have obvious safety implications and could negatively impact train operations. (*Id.*) **7**

The Restoration Along Sausal and Seminary Creeks (Group 4) also presents a possible safety concern. The creek restoration activities raise the issue of whether the public access improvements would attract any additional pedestrians or cyclists across or around the UP Line. If so, the Draft EIR should examine the possible safety impacts. **8**

The City should therefore closely analyze pedestrian and bicycle safety, and the likelihood of trespassing onto the UP right-of-way in order to set forth appropriate mitigation measures. As the Draft EIR recognizes, Policy W2.5 of the City's General Plan states: "[t]o create safe access to water pedestrian, bicycle, and automotive railroad crossings should be provided where feasible." Thus, appropriate mitigation measures are not only desirable in their own right, but are also crucial to the Project's consistency with the General Plan. Specifically, the City should consider requiring the developer to install grade-separated pedestrian and bicyclist crossings as well as require the developer to construct only grade-separated roadways across the UP Main Line. To this aim, UP appreciates the City's decision that the preferred plan for the continuation of the Bay Trail along the Oakland Estuary is for the trail to pass under the railroad bridges along Fruitvale and High Avenues. (Draft EIR, pp. 55, Appendix D at p. 3.) **9**

The City may also want to consider requiring the developer to eliminate the existing at-grade rail crossings by either constructing grade-separated crossings at those locations and/or eliminating the crossings altogether. Other possible mitigation measures that the City should consider include, but are not limited to, solid barriers along the full lengths of the right-of-way, (for example, walls, as opposed to fencing, to manage pedestrians and vehicles), relocating such land uses far away from the tracks where possible, setbacks and buffers, the installation of sound walls or other barrier fencing along the full lengths of the right-of-way, pedestrian gates, pavement markings, "no trespassing" signs, railroad safety education programs, and planning for safe transportation routes to schools, entertainment, shopping, and recreational facilities. **10**

4. Vibration

As the Draft EIR recognizes, the Project sites are located adjacent to or near the existing UP Line, which generates airborne vibration. (Draft EIR, p. 175.) It is well-known, however, **11**

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

that UP's rail operations, as well as passenger trains, also generate ground vibration associated with an active railway. For instance, the Waterfront Trail and pedestrian, bicycle and small boat improvements likely will attract more people to the area immediately surrounding the UP Line, thereby exposing them to typical vibration that come with freight and passenger rail service. The Project is therefore anticipated to expose increased population to existing vibration, and the City should analyze this possible impact.

11 cont.

Possible mitigation measures include a condition of approval that requires the developer to disclose to the general public this pre-existing and predictably-occurring vibration, as well as construction and design techniques (*e.g.*, trenching and/or floating floors) that absorb and/or minimize interior vibration.

5. Mechanical Odor

Finally, it is also well-known that locomotives not only generate noise and vibration, but also may emit mechanical odors. Other existing land uses in and around the site include industry and commerce, and such land uses typically generate odors associated with their specific uses, thereby potentially resulting in cumulative impacts that some people in the area may notice. The various development and improvements proposed for the Project will attract more people to the area surrounding the UP Line and therefore expose them to existing mechanical odor. Although the Draft EIR briefly discusses odors from restaurants, manufacturing plants, agricultural operations, and industrial facilities, it does not mention the mechanical odors associated with locomotives. (Draft EIR, p. 155.) The City should therefore consider analyze this potential impact in the Draft EIR and implement any necessary mitigation measures.

12

***

UP appreciates this opportunity to comment on the Draft EIR for the Project and hopes that the City, as lead agency, gives due consideration to the above concerns. On UP's behalf, we would welcome the opportunity to sit down together with City officials and staff to discuss this Project as it progresses or any other project that may relate to UP's property or operations within the area. Such a discussion would afford UP and the City the opportunity to work in collaboration to ensure that the Project and all future development near UP lines are compatible with the rail services that will continue to serve the area for years to come.

Please give notice to UP of all future developments with respect to this Project and any other proposed transportation improvements in the vicinity as follows:

13

Mr. Terrel Anderson
Manager of Industry and Public Projects
Union Pacific Railroad Company
10031 Foothills Boulevard
Roseville, California 95747-7101

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

With a copy to:

Andrew Bassak, Esq.
Shirley Jackson, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 30th Floor
San Francisco, California 94111.

13 cont.

Please do not hesitate to contact our office if you would like to schedule a meeting with UP or have any questions. UP will monitor this project with interest.

Sincerely,

Shirley E. Jackson

Shirley E. Jackson

cc: Andrew Bassak, Esq.
Mr. Terrel Anderson

19869:6608883.2

LETTER B25
Steefel, Levitt & Weiss
Shirley E. Jackson
September 14, 2007

Response B25-1: The comment letter was received on September 14, 2007, three days after the close of the comment period on September 11, 2007. Although the 45-day comment period for the Draft EIR had closed, the City has elected to respond to the comments provided in the letter.

Response B25-2: The comment, which describes elements of the proposed Measure DD Implementation Project and states that the project is likely to impact the Union Pacific Railroad (UPRR) lines and rail services, is noted. It requests that the EIR analyze traffic, safety, trespassing, vibration and mechanical odor issues associated with the proposed project's proximity to the rail line and require mitigation measures to reduce impacts. Refer to Response to Comment A7-1 and Responses to Comments B25-3 to B25-12 for responses to the specific issues raised for each topic.

Response B25-3: The comment, which describes certain aspects of the history of the Union Pacific Railroad (UPRR) and its presence in and around Oakland, is noted.

Response B25-4: The comment incorrectly states that the project would result in a substantial increase in population within close proximity of the UPRR Main Line. The project does not propose to build housing or other facilities that would substantially increase the residential population in the vicinity of the UPRR Main Line.

It is recognized that the East Oakland Sports Complex project would increase traffic volumes at the railroad crossings located at 98th Avenue and 85th Avenue. The study showed that peak hour traffic volumes on 98th Avenue would increase by less than two percent as a result of the project. The traffic added would not perceptibly affect traffic service levels at the rail crossing. The study did not evaluate traffic volume changes at 85th Avenue because the traffic volumes are relatively light and changes in traffic volume resulting from the Sports Complex were expected to have a less than significant impact on traffic operations along 85th Avenue.

The effectiveness of existing safety measures in place at all railroad crossings leading to the Sports Complex would not be significantly affected by the minimal changes in traffic volumes associated with the project. The small changes in traffic volumes would not justify construction of grade-separated crossings. Permanent blocked-off closures of existing at-grade crossings would transfer traffic volumes to other streets and could result in secondary traffic impacts.

Response B25-5: Please see Response to Comment B25-4 regarding population effects of the proposed project. In addition, project facilities, with the exception of portions of the Waterfront Trail and the trail along the Lake Merritt Channel, are located well away from (a quarter mile or more) the UPRR lines as shown in the figures provided in the Project Description and would not bring substantial numbers of people to the rail crossings.

It is recognized that there is a potential for pedestrians and bicyclists to travel between project elements (such as the Waterfront Trail and Lake Merritt) along 5th Avenue, Oak Street, or other streets near Embarcadero. The Draft EIR did not specifically address pedestrian impacts at railroad crossings because there are existing safety measures (i.e., crossing gates, warning lights, and chain link fencing along the Embarcadero) that would limit the ability of pedestrians and bicyclists traveling between the project elements to cross the tracks. The numbers of pedestrians or cyclists crossing the tracks to travel between project areas would not compromise the existing safety features at the crossings or exceed the capacity or capabilities of the existing controls to limit crossings of the rail lines.

The Waterfront Trail, which runs parallel to the UPRR lines, is separated from the tracks by roads, such as the Embarcadero and Interstate-880, and fencing. This infrastructure provides barriers between recreational users of the trail and the UPRR lines at non-street crossing locations. The trail along the Lake Merritt Channel currently ends just south of the 7th Street Bridge and this would not change as part of the project. No new at-grade crossings of the UPRR line are proposed as part of the project although existing crossings at 5th Avenue and Oak Street would be used by bicyclists and pedestrians, as they are now, to travel between the waterfront and other areas of Oakland. Refer to Response to Comment A7-1 for additional discussion of the rail line crossings.

The text on page 130 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (Pedestrian and Bicycle Transportation) (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing safety features would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

The text on page 139 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control

access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing facilities would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

Response B25-6: Please see Response to Comment B25-4 regarding population effects of the proposed project.

It is recognized that the project may increase pedestrian and bicycle activity along 5th Avenue, 85th Avenue and 98th Avenue; however, the increase is expected to be small and would be consistent with City of Oakland's policy to encourage pedestrian and bicycle travel along these routes. For the Draft EIR, a review was performed of the potential of the project to conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation and was found to be consistent with City policy. The Oakland Bicycle Master Plan proposes bike lanes along 5th Avenue and proposes designation of 85th Avenue and Edes Avenue as Class III bike routes. Similarly, the Oakland Pedestrian Plan identifies 5th Avenue and 85th Avenue as neighborhood pedestrian routes, 98th Avenue as a City pedestrian route, and Edes Avenue as a District pedestrian route.

The increase in pedestrian activity near the UPRR Line would not be of sufficient magnitude to significantly affect safety around the tracks and would not justify construction of grade separated crossings. Walking, jogging, or bicycling across the UPRR lines at the aforementioned at-grade crossings would be consistent with City policies, plans and programs. The potential for trespassing onto the UPRR right-of-way would not be substantially affected by the project.

Response B25-7: The comment, which states that the UPRR would strongly oppose an at-grade crossing of the UPRR tracks in the vicinity of the Lake Merritt Channel and that new crossings or modifications of existing crossing would require permission of the California Public Utilities Commission, is noted. Refer also to Response to Comment A7-1.

Response B25-8: The locations of proposed creek restoration, preservation and acquisitions sites are shown on Figure I-3 and described in Table III-2. None of the project locations along Sausal and Seminary creeks as cited in the comment are in close proximity to UPRR lines. The nearest activity associated with Sausal Creek is a daylighting of the creek at Hawthorne School, which is located about 0.5 miles from the railroad lines. The nearest activity on Seminary Creek site, which is also located about 0.5 miles from the railroad lines, is the removal of a concrete channel and site restoration. Both sites are located in residential areas and there is considerable urban infrastructure between the restoration sites and the railroad, making traffic, pedestrian or bicyclist connections between the locations unlikely. Neither of the proposed activities would attract vehicles, pedestrians or bicyclists to the UPRR lines.

A creek restoration site along Lion Creek on San Leandro Boulevard near 66th Avenue is in closer proximity to the UPRR tracks than the creek locations cited in the comment. The restoration activity at this site would create wetlands along an existing section of creek within a residential project and an existing park. The UPRR tracks lie to the west of the park. The restoration is not expected to substantially increase park use and most users of the park would come from the residential areas to the east rather than from the industrial area to west. Thus, the creek restoration would not generate a significant number of vehicle, pedestrian, or bicycle crossings of the UPRR tracks.

Response B25-9: The entire text of General Plan Policy W2.5 that is cited in the comment reads, "**Improved Railroad Crossings.** To create safe access to the water pedestrian, bicycle, and automobile railroad crossings should be provided where feasible. Crossings could include grade separations, at-grade crossings, skyway bridges, or connections between buildings." The policy analysis in Appendix D of the Draft EIR correctly states that the policy is not applicable to the Lake Merritt and Lake Merritt Channel, Recreational Facilities, and City-wide Creeks Groups as no rail crossings are proposed as part of these groups; the under-crossing of the rail line proposed as part of the Waterfront Trail is consistent with the policy as well. It should be noted that the policy includes at-grade crossings as an option for safe access to the waterfront, where feasible. The comment, which states that the UPRR appreciates the decision to route the Waterfront Trail to pass under the railroad bridge at Fruitvale and High [sic] Avenues, is noted. Refer to Responses to Comments A8-1, B22-2 and B22-3.

Response B25-10: The comment, which suggests design features as mitigation for reducing safety hazards at rail crossings, is noted. As impacts to safety were found to be less-than-significant no mitigation is required. Refer to Response to Comment, B25-4 to B25-6.

Response B25-11: The impacts of ground-borne vibration are analyzed on p. 181 of the Draft EIR, which concludes that there would be no impact during the project's operational phase. The proposed Measure DD Implementation Project would not expose a substantial number of people to ground-borne vibration associated with the UPRR operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors into proximity with the UPRR lines. No new crossings of the UPRR lines are proposed as part of the project. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. The text on page 181 of the Draft EIR is revised as follows:

(4) Vibration. None of the four project groups contain components that would generate ground-borne vibration levels that would be perceptible to the average person. ~~There would be no impact during the project's operational phase.~~ The project may briefly bring people into proximity with transportation facilities along the Waterfront Trail, such as railroad tracks, that produce ground-borne vibration. But the project would not frequently expose a substantial number of people to ground-borne vibration. Construction activities associated with implementation of the project,

including proposed pile driving activities, could temporarily expose persons in the vicinity of the proposed project construction areas to ground-borne vibration or ground-borne noise levels. However, the project would comply with the construction hours specified in the City's Noise Ordinance and the City's standard Conditions of Approval would be applied. Implementation of the Conditions of Approval would ensure potential ground-borne vibration would be avoided or reduced to a less-than-significant level.

Response B25-12: The proposed Measure DD Implementation Project would not expose a substantial number of people to odors associated with the UPRR railroad operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors in to proximity with the UPRR railroad lines. No new crossings of the UPRR lines are proposed as part of the project. The text on page 155 of the Draft EIR is revised as follows:

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

The text on page 159 of the Draft EIR is revised as follows:

(5) Objectionable Odors. The operation of the project components of Measure DD would not generate objectionable odors. Typically, major sources of odors include restaurants, manufacturing plants, and landfills. Other odor producers include industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects which are not expected to generate objectionable odors. The project may briefly bring people into proximity with industrial or transportation facilities that produce odors along the Waterfront Trail, but exposures would be brief and affect a relatively small number of people on an occasional basis. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. This potential impact would be less than significant.

Response B25-13: The comment, which states that the UPRR would welcome the opportunity to meet with the City to discuss its concerns, is noted.

C. VERBAL COMMENTS

The Planning Commission held a Public Hearing on September 5, 2007 to accept verbal comments on the Draft EIR from agencies, organization or interested individuals. The comments presented at the hearing are summarized and enumerated in attachment C1 and written responses follow.

Planning Commission Hearing
C1

COMMENTS AT THE OAKLAND CITY PLANNING COMMISSION PUBLIC HEARING FOR THE MEASURE DD IMPLEMENTATION PROJECT

September 5, 2007; City Council Chambers, City Hall, 1 Frank H. Ogawa Plaza

Public individuals spoke first, followed by Planning Commissioners.

Mike Bishop. Introduced himself as a representative of Hanson Aggregates at 4501 Tidewater Avenue in Oakland. Made the following comments:

- He has received little notice of scoping meetings for the project; he has been involved with the Bay Trail, working with City and Regional Parks. **1**
- Development of steel canopy noted in Table II-1 more complicated than described; site also has deteriorated dock that needs to be considered. **2**
- Narrowing of navigable channel under the bridges along the estuary makes it more difficult for barges to use the channel and might require switching to trucks to bring materials to Oakland. **3**
- Requested that the navigable channels be kept open. **4**

John Wilson. Made the following comments: **5**

- Many people who wanted to speak tonight had to leave earlier.
- Why are we 5 years into the Measure DD process and only now preparing an EIR? **6**
- The project has the appearance of poor planning and underfunding. There have been major design changes after the bond measure was passed. Why have projects changed? **7**
- Projects are stalled because they are overbudget.
- Government entities are only now being contacted. **8**
- Expressed concern about plan to remove trees; there is a mythology that only dead trees would be removed. **9**
- Found Figure III-1 helpful. Reason to remove trees was to create a view corridor. Asked where view corridor is and expressed concerned about tall buildings being constructed around lake **10**
- Lake is oldest designated wildlife sanctuary in nation. Boundary goes 1,065 feet from old tidal boundaries. **11**

Orna Sasson. Made the following comments:

- Voted on Measure DD to preserve parks.
- Old trees should be cared for by arborists.
- Parks are not the place for parking lots. **12**
- Need easements to preserve City parks.
- Let 1,000 parks bloom.

John Butcher. Introduced himself as the port captain for FOSS Maritime in Richmond. Made the following comments:

- Stated that he was here to discuss proposed walkway under bridges along the estuary. FOSS Maritime is a company of professional mariners that transports sand and other materials along waterways.
- The proposed walkways under bridges would reduce the openings by 25% under some conditions. Barges are 60-feet wide and the opening would be 90 feet when only one side of bridge is open. **13**
- Invited commissioners to see how channel would be constrained.

- A brief discussion occurred between Mr. Butcher, Commissioner Boxer, Joel Peter (Measure DD Program Manager), and Claudia Cappio (Community and Economic Development Agency, Development Director) ensued clarifying the proposed location and design of the walkway. Joel Peter indicated that the City believes that the walkway could be designed with adequate safety to protect users of the trail. **13 cont.**
- Mr. Butcher concluded by stating that he did not believe the walkway design is safe and that the Coast Guard agrees.

Nancy Rieser. Introduced herself as a member of Friends of the Lake. Made the following comments:

- Noted Friends of the Lake is sending written comments. **14**
- Stated that there is a lack of coordination with regional and state agencies with regards to the 12th Street Channel. **15**
- Stated the she has concerns about toxics in the bay fill in the project area that exceed state standards. **16**

David Mix. Made the following comments:

- Document is too extensive and not enough time at public hearing **17**
- Appendix C documents are too difficult to read, due to poor reproduction **18**
- He objects to entire document; it is based on improper or false material, junk science **19**
- Sewers and storm sewers have historically flowed into the lake and channel **20**
- Noted various studies that looked at flows through the channel. Some studies used MIKE II model and MIKE II didn't adequately consider elevations and size of culverts. **21**

Jonas LaMattery-Brownell. Introduced himself as a member of the Lake Merritt Neighbors Organized for Peace and a participant in the tree spirit photo by Jack Gescheidt. Made the following comments:

- Encourages the City to save as many trees as possible around Lake Merritt.
- The commentor read the following poem, which he had composed: **22**

The Merritt of Trees

Lake Merritt lakeshore's trees are alive,
As alive as you and me,
I run by them often and say,
Hey sticky sister, hey brother barkful,
Hello old one prickly, hello relatives rooted.
When I breathe, I breathe tree.
Just like sipping lake or sipping melted glacier stream,
Here in Oakland I breathe salty sunny air, a little pollution pepper and still too...
All the trees of Lake Merritt

Jacquee Castain. Made the following comments:

- Elmhurst District and East Oakland supports the East Oakland sports and swim center **23**
- Asked for City's help on cleaning up a nearby contaminated creek site on 85th Avenue. **24**

- Noted that according to the staff report and the EIR notice, comment period will end on September 10, which is a City holiday when offices will be closed. | 25
- The City of Oakland and the planning commission should allow more than 2 minutes per commentor to make verbal comments. The Planning Commission has reduced available meeting time over the past 4 years, which limits the number of people who can comment. | 26
- Measure DD funding was inadequate. | 27

Planning Commissioners

Michael Lichty. Made the following comments:

- Stated that many issues raised tonight didn't appear germane to the EIR and will be considered during engineering and design review. Claudia Cappio noted in response that impacts to navigable waterways are relevant to CEQA evaluation; document needs to identify impact to safety and navigation around bridge. | 28
- Need to resolve safety issue outside of the EIR process during the design work; hope issues will be taken seriously.

Paul Garrison. Made the following comments:

- Requested an update on the litigation about the proposed tree removals. Mark Wald provided an update. | 29

Suzie Lee. Made the following comments:

- Recommended commentors submit comments in writing;
- Expressed concern about impact to navigation and requested that impact be given serious consideration. | 30

Douglas Boxer/Michael Colbruno. Made the following comments:

- Commissioners stated that they would accept previous speaker's offer to take them out on a tug boat to observe the proposed sites of the trail walkways along the estuary. | 31

Madeleine Zayas-Mart. Made the following comments:

- Requested clarification of phasing and funding of project. Claudia Cappio noted that City is leveraging matching and supplemental funding from various sources. | 32

Oakland City Planning Commission Public Hearing Comments
September 5, 2007

Response C1-1: Refer to Responses to Comments B4-1 and B22-1 (comment letter B22 was submitted by the speaker).

Response C1-2: Refer to Response to Comment B22-3.

Response C1-3: Refer to Response to Comment B22-2.

Response C1-4: The comment, which requests that navigable channels be kept open, is noted. For additional discussion of this issue refer to responses to comment letters B8 (from the U.S. Coast Guard) and B22 (Mr. Bishop's written comments on the Draft EIR).

Response C1-5: The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-6: A history of the environmental review process for Measure DD-funded activities, which explains what has occurred between passage of Measure DD and the release of the Draft EIR, is provided in Chapter III, Project Description on pages 23 and 24 of the Draft EIR.

Response C1-7: The comment, which expresses concern about funding and planning for the Measure DD activities, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-8: Refer to Response to Comment B4-1.

Response C1-9: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30.

Response C1-10: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30. No tall buildings, which would block view corridors, are proposed as part of the project.

Response C1-11: The comment is noted. The Draft EIR notes the Lake's designation as a wildlife refuge on page 226.

Response C1-12: The comment does not address the environmental analysis of the Draft EIR so no further response is provided.

Response C1-13: The comment raises concerns about the impact of the Waterfront Trail on maritime shipping. Refer to responses to comment letters B8 and B22.

Response C1-14: The comments were submitted in writing. Refer to responses to comment letters B15 and B16.

Response C1-15: Refer to Response to Comment B4-1.

Response C1-16: Refer to Response to Comment B15-7.

Response C1-17: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-18: Full size copies of the original public comment letters that were received during the EIR scoping period have been and are available for review at: City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612.

Response C1-19: Mr. Mix submitted his comments in writing. Refer to response to his comment letter B11, in particular Responses to Comments B11-3 to B11-5, which are included under the heading "Junk Science" in the comment letter.

Response C1-20: The comment regarding the historic discharges to Lake Merritt is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response C1-21: Refer to Response to Comment B11-3.

Response C1-22: The comment, which addresses the merits of the project, is noted.

fallen trees, sadness
spring tides flow strong again
park and lake reborn

Response C1-23: The comment, which addresses the merits of the project, is noted.

Response C1-24: The comment, which identifies a creek segment not included in the Measure DD Implementation Project, is noted.

Response C1-25: Due to the City holiday, the City accepted comments on the Draft EIR until September 11, 2007.

Response C1-26: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-27: The comment, which states that Measure DD funding in inadequate, is noted.

Response C1-28: Refer to responses to comment letters B8 and B22.

Response C1-29: The requested information does not pertain to the environmental analysis of the Draft EIR. City legal counsel responded to the question at the public hearing.

Response C1-30: The statement regarding submittal of comments in writing is noted. Refer to responses to comment letters B8 and B22 for discussion of impacts to navigation and safety along the estuary.

Response C1-31: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response C1-32: Because of the large number of elements of the Measure DD Implementation Project, which are geographically dispersed across the City, a phasing plan for the entire project is not provided in the Draft EIR. Phasing and project status information for individual elements is provided where such information is available (see Table III-1 of the Project Description, for example). Individual projects would receive funding from a variety of federal, State and regional sources in addition to receiving Measure DD funds. The source of funding does not pertain to the environmental analysis of the Draft EIR.

Letter
B17

01-11-07

John WILSon

CITY OF OAKLAND

EQUAL ACCESS ORDINANCE

Final comment

Please Include Lake merritt master Plan in DDEIR.

MAÃU ÑÔN KHIEÁU NAÏI (Tieáp theo)

Chæ Daønh Cho Ban Söû Duïng

Xin cho bieát tröôøng hôïp khieáu naïi naøy ñaõ ñöôïc giaûi quyeát nhö theá naøo:

IN REGARDS TO DD ENVIRONMENTAL IMPACT REPORT(EIR).

Please read Lake Merritt ~~Plan~~ Park master Plan. Published July 2002.

(JW)

SPECIFICALLY:

Pages: Including

(JW)

& Section 3 Pages 29 Thru ~~55~~ 55

Please answer why oakland can not Follow The outline Sugested in the Lake Merritt Park master Plan. Specifically in Regards To Tree management, OF The oldest designated Wildlife Sanctuary in The United States.

Ngöôøi Lieân Laïc/Chöùc Vuï: _____

Ñieän Thoaïi Ban Ngaøy: ( ) _____

Moãi Ban/Cô Quan phaûi löu moät baûn sao cuûa thö khieáu naïi trong it nhaát 3 naêm. Xin göûi moät baûn sao cuûa thö khieáu naïi ñaõ noäp cho Vaên Phoøng Bình Ñaúng trong vieäc Söû Duïng Dòch Vuï (Equal Access Office) trong voøng 30 ngaøy keå töø ngaøy nhaän ñöôïc khieáu naïi.

Xin Göûi Maãu Ñôn naøy tôùi: CAO-Equal Access Office, 1 Frank H. Ogawa Plaza, 3rd floor, Oakland, CA 94612

Please Publish Pages From the Lake merritt master Plan Including Section III-29; III-30; III-32; III-34; III-35 III-37. Do not limit The EIR To these Pages.

CAOeao0707aV1

1

Letter
B17
attach.

Cultural Landscape

- In the 1870s, the area, then pristine, was inhabited by a handful of settlers and a few Costanoan (Ohlone) and Miwok Indians. At the head of the slough (the present location of the Grand Lake Theater) was a pier operated by the Peralta brothers for boats transporting timber or cattle products to the bay.
- In 1909, during Mayor Frank Mott's tenure, Oakland acquired the entire lake frontage, set up the first Park Commission and began to develop Lakeside Park. The Embarcadero area including Trestle Glen Creek and Lakeshore Avenue to Park Street had wooded creek land, spacious upper areas, natural and historic oak trees. Between 1907 and 1912 the road around the Lake was paved, the boathouse and canoe house were built, a boat landing was created and the Camron-Stanford house was acquired for the new Oakland Museum
- In 1909, the architect Oscar Praeger was asked by Mayor Frank Mott to design parts of the existing landscaped 45-acre Lakeside Park. Preliminary ideas included the original bowling green and fountain site, augmented by live oaks with deciduous oaks, (Quercus cerris, rubra and coccinea), groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries.
- Trees were added from the 1915 World's Fair held on Treasure Island. At one time, a conservatory similar to the Conservatory of Flowers in Golden Gate Park existed on Adams Point in Oakland.
- The original lights, which are today a landmark, were installed in 1925 by consulting electrical engineer, Romaine W. Myers. The "Necklace of Lights" referred to the 128 electroliers installed along the shoreline and the "Festival Lights" were the strings of lights suspended between temporary poles and the electroliers. The circuit included 3,400 lights. In 1946, a Dr. Brown bought the discarded "Festival Lights" from a junkyard and they ended up lighting a mission, mission hospital and nearby villages close to the City of Swatow, China.
- Fairyland was built in the 1950s and reputedly served as the inspiration for Disneyland. The architect of approximately 50 of the original structures was William Russell Everritt. Approximately 60 settings based on fairy stories and Mother Goose rhymes form the pioneering playground. Currently, the non-profit entity run by Nancy Stark has renovated the gardens, entry and oversees educational programs. New programs will include a reading and learning program for preschool children and a volunteer gardener's docent tour of the Fairyland grounds. Mapping and plant collection lists exist for the Fairyland grounds.
- In November 1999, the one-third-acre Bonsai and Suiseki Display Garden opened. This nationally known collection of precious trees and stones includes a display booth, a fence surrounding the bonsai collection with entry gate, volunteers' office, display building and future workshop. It serves as the open-air cultural museum of the Golden State Bonsai Federation Collection - North. Many bonsais, by outstanding masters and collectors, have been in families for 20, 30 or 40 years. A special 400-year Japanese black pine bonsai was part of the 1915 Pan Pacific Exposition in San Francisco.

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PARK LANDSCAPE

Figure III.24 Existing Vegetation

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Vegetation Survey and Analysis

A tree survey was conducted, which identified a wide variety of planting in Lake Merritt Park and served as the basis for the Existing Vegetation Plan. Vegetation is classified into the following zones:

- Coastal bluff plant communities
- Fenced area (Fairyland and Botanical Garden)
- Mixed oak woods
- Mixed pine woods
- Groves of other trees
- Flowering ornamental trees (accent)
- Street trees
- Lawn
- Significant and historic trees

Historic trees are those planted after the 1915 World's Fair and/or trees referenced in Praeger's original planting design, such as the New Zealand Tea trees. These trees were identified largely from early writings and plans. Some trees have been newly planted (replacing those diseased), but there has been much resistance to planting trees because some residents prefer to preserve their view of the Lake. There was a large planting of ornamental cherry trees during the 1950s, but many of the trees were vandalized.

Significant trees are those trees that have grown to a large specimen size and/or trees or groves of trees that form a special, sanctuary space. Specimen trees include some specific trees within the Botanical Garden that were identified as "thriving" in the East Bay but not in San Francisco.

Lawn occurs predominantly in areas without trees as well as areas under trees. The planting slope to the west of Fairyland was once groundcover, but due to lack of maintenance, a rodent population became problematic.

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PARK LANDSCAPE

Landscape Themes

Bio-diversity

The Landscape Plan will focus on enhancing the biological diversity and variety of life at Lake Merritt Park. Lake Merritt is the first wildlife refuge declared in the United States. The challenge is to enhance this wildlife refuge within an encroaching urban environment while responding to increasing human recreational demands. The Landscape Master Plan builds upon the existing wildlife habitat and park, offering a wide range specialty plants and environments. Restoring lost vegetation such as oak trees along the narrow vegetated perimeters of the Lake will provide a wider range of habitat and wildlife corridors to balance plant, animal and human needs.

Multiculturalism

Building upon the multicultural theme, development of the Botanical Garden extensions beyond the fenced gardens will capitalize upon the existing plant collections. Low groundcover massing of plants such as Hemoracallis and Phormium tenax will provide hardier theme plantings beyond the fenced areas. These plants will be selected from the Mediterranean climate, African continent, temperate and mild temperate climates of Asia and Australia, tropical climates of New Zealand, native Bay Area habitats and drought-tolerant species.

The drought-tolerant garden will combine plants from all areas to provide a design theme based on form, shape, color and textures. The Botanical Garden extensions (approximately 20-45 acres) will provide seamless landscape transitions and add to the overall landscape character of the Park. Educational themes of the Botanical Garden will stress the ecological values of plants such as low water usage. In keeping with historic precedent, New Zealand tea trees (Leptospermum), "whose branches, as noted in early writings, "will droop into the lake and give a most pleasing effect," will be planted as accents along the bulkheads and at the gateway entries into the Park.

Ecological Systems

Prior to the 1909 Park plantings, the existing site supported groves of oaks and a few buckeye trees. Today striking specimens of this period still exist and add to the rarity of the Park's collection of trees. The Landscape Plan extends clusters of Valley and Blue Oaks along the Lakeside and Lakeshore portions of the Park where site conditions permit.

Low groundcovers under oak trees will provide native oak woodland habitat for plant and animal species and reduce maintenance. A balance of open lawn areas and groundcover areas will help to restore bird and animal resources.

Along the Ecological Zone a restored tidal marsh is envisioned, consisting of upland and wetland habitat and vegetation. In the Ecological Zone Area, the water's edge will be supplemented with wetland plants to enhance bird habitat. The walkway will be pulled back from the water's edge to allow more extensive wildlife habitats, similar to those existing prior to the undergrounding of creeks and damming of the estuary, and to provide more natural viewing areas for people.

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Riparian Corridors

The large arterial streets surrounding Lake Merritt follow the route of the four creeks that formerly drained into the Lake Merritt estuary: Trestle Glen Creek (Grand Avenue / Lakeshore Avenue), Glen Echo Creek (Harrison Street), Park Boulevard Creek (Park Boulevard- Foothill Street) and San Antonio Creek (12th Street). Current conditions along these former riparian corridors are as follows:

- Trees along Grand Avenue are London plane trees with limbs pruned back. Past the freeway the trees are evergreen flowering pear trees. Foothill Street has London plane trees in the street median and scattered trees and vegetation in Athol Park and along the sidewalks.
- Many of the existing plantings along these streets are an accumulation of smaller landscapes and not part of a large cohesive design theme. Scattered trees exist along both Lakeside Drive and Lakeshore Drive.

In order to visually recall the former creeks, riparian planting is proposed along these corridors, as outlined in the following table.

Botanical Name	Common Name	Comments	Habitat
TREES			
Platanus racemosa	*California Sycamore*		X
Alnus rhombifolia	*White Alder*		X
Acer macrophyllum	*Big Leaf Maple*	where conditions permit	X
Salix babylonica	*Weeping Willow*	where conditions permit	
SHRUBS			
Calycanthus occidentalis	*Spice Bush*		X

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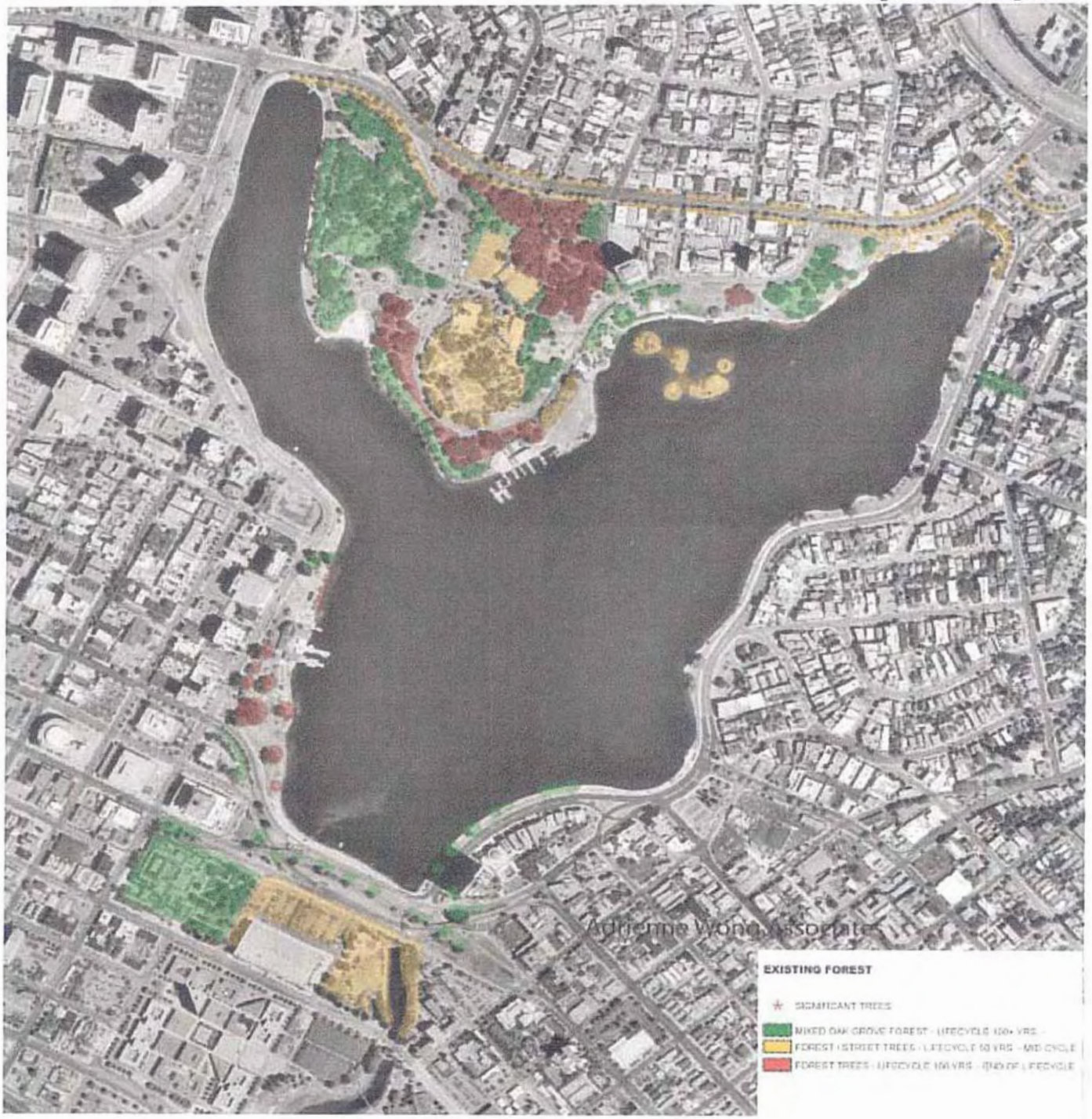
PARK LANDSCAPE

Figure III.25 Existing Forest



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Urban Forestry Program

Existing Conditions

Lake Merritt Park provides the City of Oakland with a signature urban forest in the heart of downtown Oakland, including many historic and heritage category trees, such as oaks, California buckeyes, and New Zealand tea trees. In general, trees in Lake Merritt Park (including Lakeside Park) fall into the following three groupings:

1. Grown prior to European settlement (1800s) - including scrub oaks and woodland oaks (Quercus agrifolia, Quercus kellogii, Quercus douglasii).
2. Planted from 1909 through 1915 - including deciduous oaks, Quercus cerris, rubra and coccinea, groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries. Included are specimen trees from the 1915 World's Fair.
3. Planted to replace diseased trees and sporadic plantings from 1950 to present.

Many of the Park's trees are at the end of their life span; the age of most forested sections of Lake Merritt is 87 years. Overmature trees are susceptible to pests and diseases, wind damage and hazardous weakening effects. Reforestation efforts need to be more aggressive to sustain the value of this urban forest and its wildlife and recreation value to the City of Oakland.

A comprehensive forest-management program is needed. New trees have only been sporadically planted largely due to the political climate of preserving views of the Lake. On a larger scale, it must be recognized that these forests also support a wide range of wildlife and will need to be replanted for wildlife habitat. New trees have not been routinely planted to offset the aging of the forest. Very few trees have been planted along the eastern, western and southern shores of the Lake. Luckily many of the oak trees have a longer life span. However, the effects of new oak diseases have not yet been clearly considered.

Goals

A reforestation program should be established that operates at a 25-30-year replacement cycle and includes the eastern and western shores as defined in the Landscape Plan. Consistent with the Existing Vegetation Plan, reforestation would serve the following goals

- Aesthetic - framing vistas, defining open spaces, including areas of smaller parks in Lake Merritt Park (i.e., Pine Knoll Park), accentuating riparian corridors (gateways), and providing color and visual accents.
- Habitat - multi-story landscape providing a diversity of habitat, food sources and canopy.
- Boulevard street trees - providing a border and extension of the Park boundaries beyond its present edge.

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PARK LANDSCAPE

Forestry Recommendations

Specifically, the reforestation program should include the following elements:

- Public Information: Provide the public with information about the reforestation project and process through informational brochures and signs at the sites and at the Rotary Nature Center.
- Native Plant Preservation: Preserve the remnant native plant population, especially the oaks and California buckeyes. Educate the public that this is an oak preserve and that other oak areas will be re-established in the historic areas such as Lakeside Drive, Lakeshore Drive and the 12th Street Peralta Park areas. Prepare gateway areas for Riparian-native populations and replanting at the gateways of El Embarcadero - Eastshore Park, 18th Street, Harrison - Adams Park area, and the Estuary Channel area.
- Specimen Tree Replacement: Replace individual large trees in kind, with similar species, such as the Italian stone pines along the promontory in Lakeside Park. Other large trees such as the California buckeye could be planted around the Bandstand areas. The New Zealand tea trees and the Auraucaria tree outside of the Botanical Gardens should be identified and addressed in replacement cycles.
- Reforesting High-Use Areas: Reforest high-use and high-visibility areas in Lake Merritt Park (Boathouse, Sailboat house, Tropical Garden area, New Promenade area, Duck Pond Feeding area, etc.) with larger trees rather than seedlings. Options include using trees being removed by the tree-spade method and moving them to new sites.
- Tree Maintenance: Provide ongoing maintenance of structurally weak trees that present risks to the health and safety of the public and property. These need to be identified, monitored and removed as an ongoing safety program. The Arborist Division of the City of Oakland is addressing safety issues but is in need of more current databases and tracking systems as afforded by a GIS tree system.
- Reforesting Plant Communities: Use species and forest communities similar to those identified in the Existing Vegetation Survey and Analysis. For example, Coastal Bluff plant communities should utilize a range of species similar to those found within the existing plant community.

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Construction Coordination with Wildife

Timing of construction can have a major impact on the wildlife and habitats in the area. Different components of the new park developments should be planned and timed to ensure that any negative impact is minimized, e.g., avoid lopping trees when birds are known to nest during breeding seasons.

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PARK LANDSCAPE

Visual Analysis

12th Street Panorama

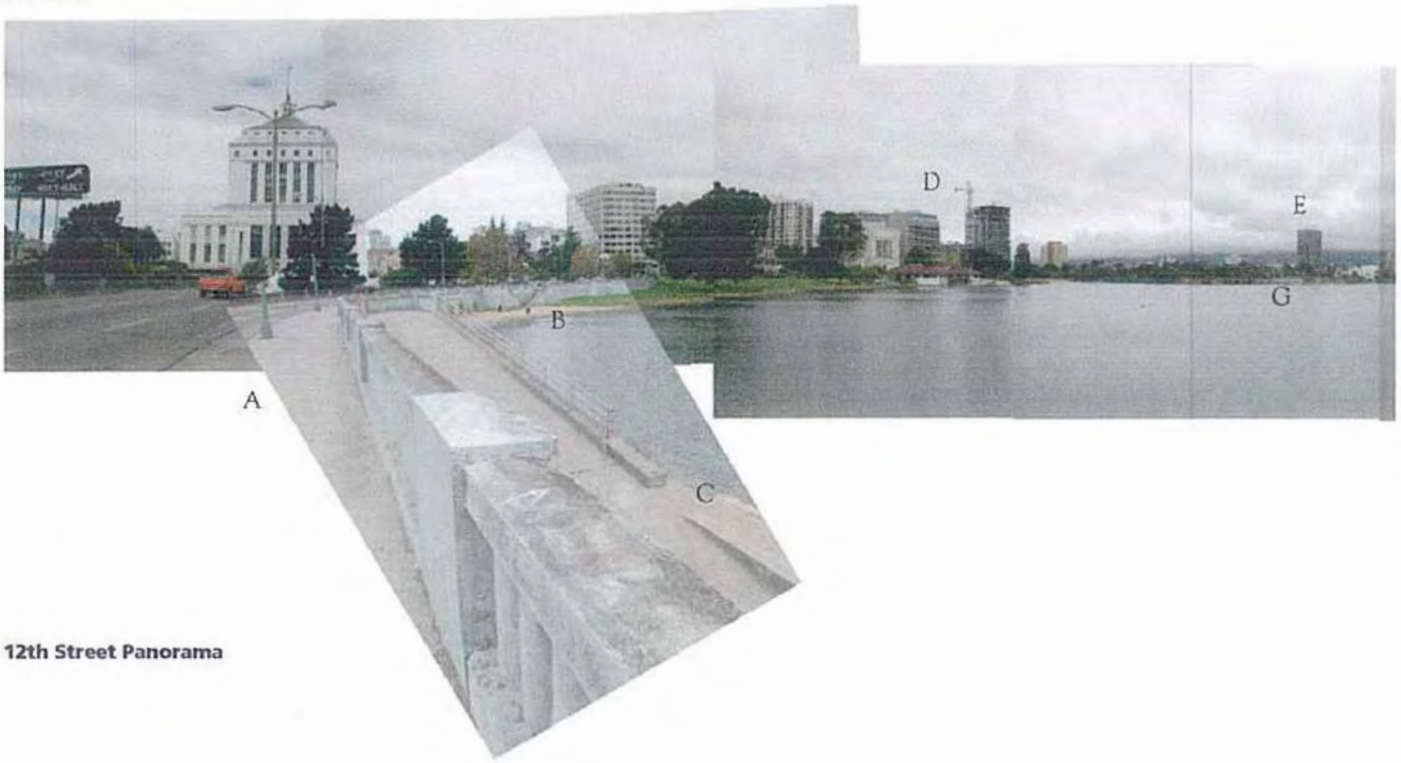
The 12th Street panorama provides many opportunities for interpretive art. The view to the north provides views of the Oakland hills and part of the watershed for Lake Merritt. There is one large building that mars the low, mass of buildings with the Oakland hills beyond. The Park portion of land is narrow and the promenade continues along the 12th street "short freeway." This is the site where the estuary water entering and exiting the Lake can be defined. It is also the historic site where the first bridge—Bridge of Sighs—connected the old township of Brooklyn and Oakland. It has a colorful history that can be interpreted here. This portion also links the Lake with Kaiser Convention Center, the Oakland Museum and Laney College. To the west is the Fire Alarm building. This site can be improved with more civic uses and landscape - park connection to the Lake.

A. Fast-moving vehicular traffic conflicts with pedestrian, bicycling activities or crossing to Kaiser Convention Center area. Provide elevation or landscape separation experience to buffer from vehicular traffic.

B. 30' to 40' wide beach at low tide used for two regattas, in July and October.

C. High tide - narrow path to ramp access. Ramp is not to ADA codes. Second area where public can contact water's edge / lake water.

D. High-rise building can frame views across the Lake, however their mass can be imposing and unattractive. Higher degrees of facade articulaiton are desirable.



12th Street Panorama

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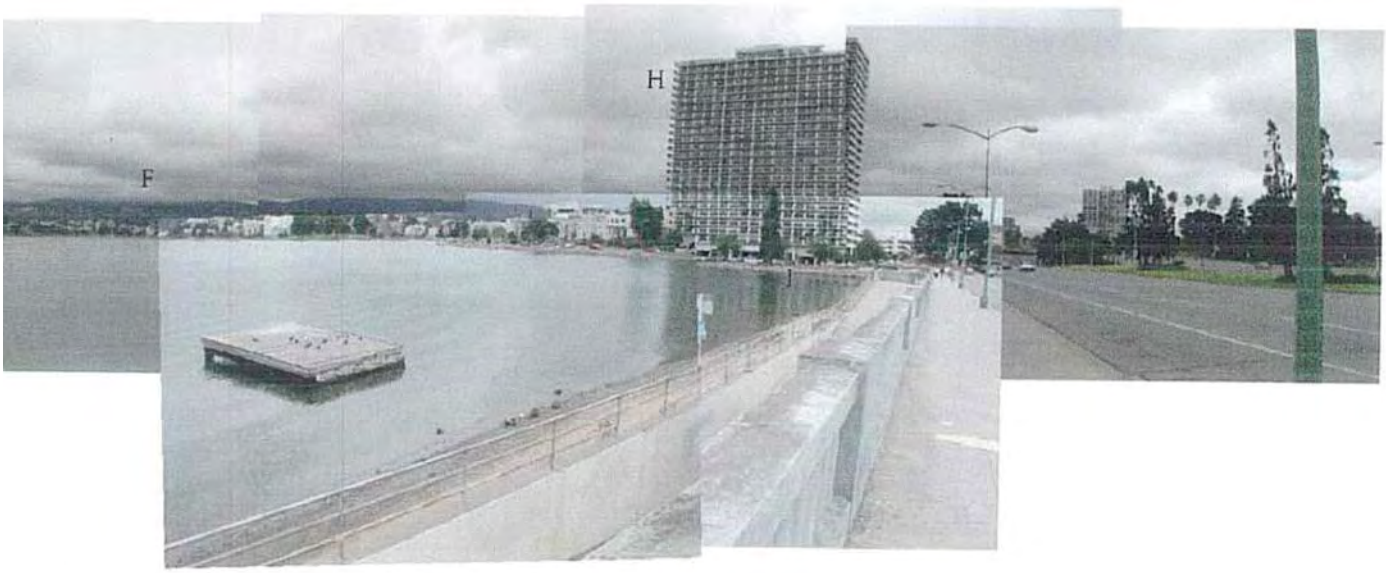
E. Few high-rise buildings on hill preserve Oakland Hills views.

F. Positive view of Oakland hills. Maintain low building heights to preserve view of Oakland hills beyond.

G. Views of sailboats and opposite shores.

H. High-rise building frames view.

I. Saltwater inflow opportunity to make tides readable.



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PARK LANDSCAPE

Snow Park Panorama

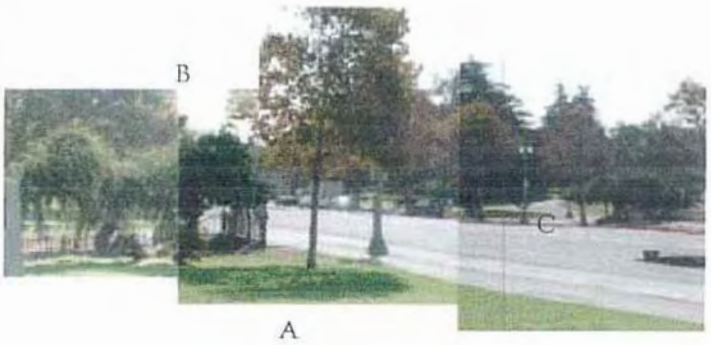
Snow Park panorama provides a large park space for commercial office workers. The expansive lawn is sometimes used by geese and their feces remain. The lawn provides a sweeping view up to the Lake with water barely visible through the park setting of mature trees. Lakeside Park looks very wooded. Additional siting of trees can visually screen the two predominant high-rises from this view. This park is a vital pedestrian link between the commercial downtown area and Lake Merritt.

A. Light standards create visual "noise" and clutter.

B. Cedar trees provide evergreen screening of buildings.

C. Good landscape views of Lake Merritt, trees and banks from Snow Park.

D. High-rise building diminishes view. Provide additional evergreen trees for screening.



Snow Park Panorama

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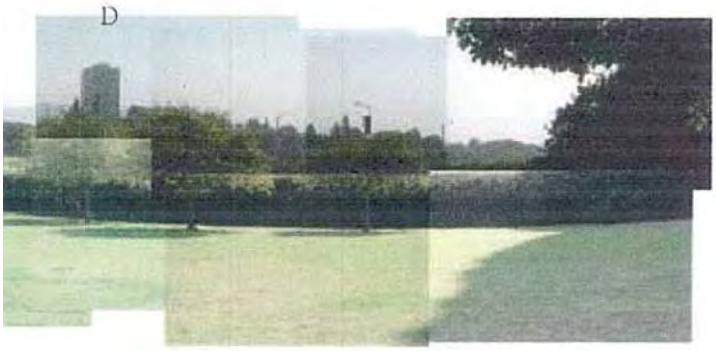
Grand Avenue Panorama

Grand Avenue Panorama

From the Grand Avenue panorama, the lawn groundcover creates a strong and positive horizontal band, extending the Park and providing visual respite from the built environment. Trees and landscape fronting the tall apartments and high-rises add significantly to the "extension" of the Park and increases the Park's apparent size. The commercial high-rises form a strong edge that is softened on the east side by the Park trees.



A. Open lawn area.

B. Mature New Zealand Tea trees have specific pruning requirements. Only a qualified arborist should prune them since damage done by inappropriate pruning will kill trees. Veteran's Memorial Auditorium Grove provides good specimens of New Zealand Tea trees that have not been damaged.

C. Lawn groundcover provides positive horizontal view.

D. Trees and landscape fronting tall buildings provide visual extension of park beyond park boundaries.

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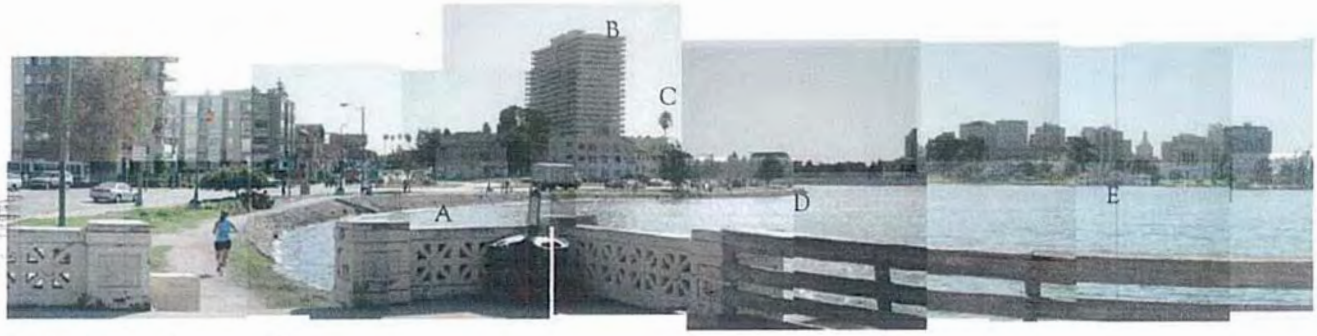
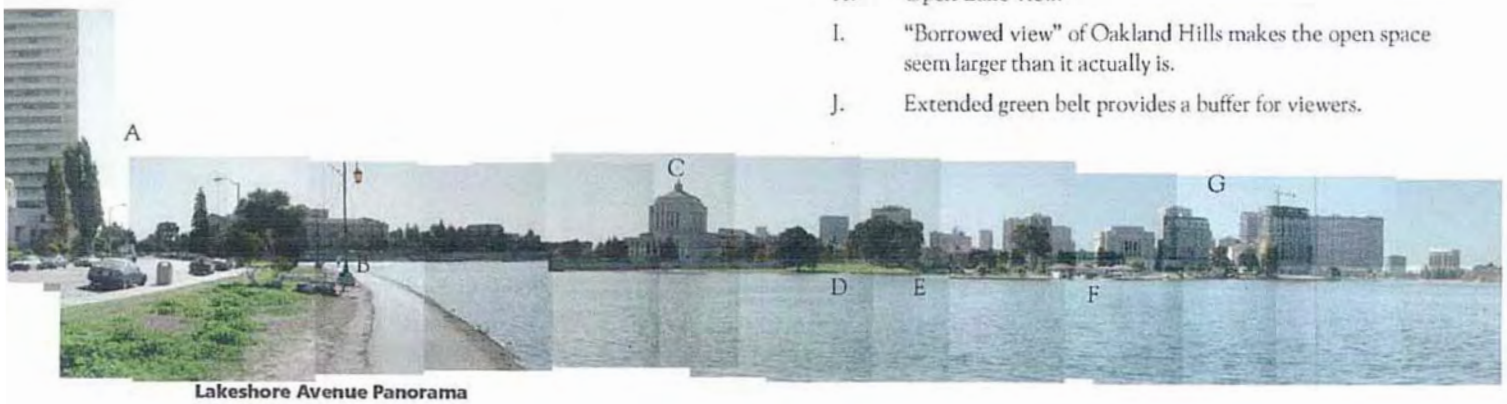
PARK LANDSCAPE



Lakeshore Avenue Panorama

Lakeshore Avenue panorama has an open feeling. There are few trees lining the Park boundary at this location. The large apartment building to the south is less intrusive at this point and probably provides residents with striking views of the Lake. From this vantage point the Federal Courthouse is visible. The Lake appears very large with a built skyline to the southwest and the Oakland hills to the northwest. The Park appears most narrow at this panorama.

A. View of apartment building's narrow side is less intrusive.
B. Retaining wall with no landscape.
C. Federal Court House.
D. Sunny open lawn area.
E. Historical Cameron Stanford House.
F. Park setting around Boathouse.
G. 19th Street skyline provides a backdrop of the Lake view.
H. Open Lake view.
I. "Borrowed view" of Oakland Hills makes the open space seem larger than it actually is.
J. Extended green belt provides a buffer for viewers.



Lakeshore Avenue Panorama

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18th Steet Panorama

18th Street Panorama

The historic pier is on axis with the Boathouse, builit in 1915 and now housing the Parks and Recreation offices. From this vantage point, the green lawn is a positive visual amenity. This historic building site is enhanced within the landscape setting. The building provides a strong architectural façade and sets the tone for the rest of the architecture within the Park. The view of the downtown skyline is striking. The banks need landscape improvements to the south and north of the pier. To the south of the pier is a view of the only angled bank where goslings can exit the lake (besides the boat ramp at the Sailboat house). The pier is in need of restoration. The balustrade details provide a solid architectural element that is enduring and important to maintain.

A. Balustrade details of 18th Street Pier provides historical time setting, pier in need of repair.

B. High-rise building provides housing density in relationship to ground area used. Guidelines for landscape trees or terraces could soften impact from ground view.

C. Existing palm tree creates striking look against skyline.

D. View of angled bank from 18th street pier provides one of the few places where goslings can exit the lake.

E. Boathouse is on direct axis view from 18th street pier, view provides park architectural setting.

F. View of 19th Street building skyline from 18th street pier.

G. Band from green lawn enhances view. Banks of soil need improvement

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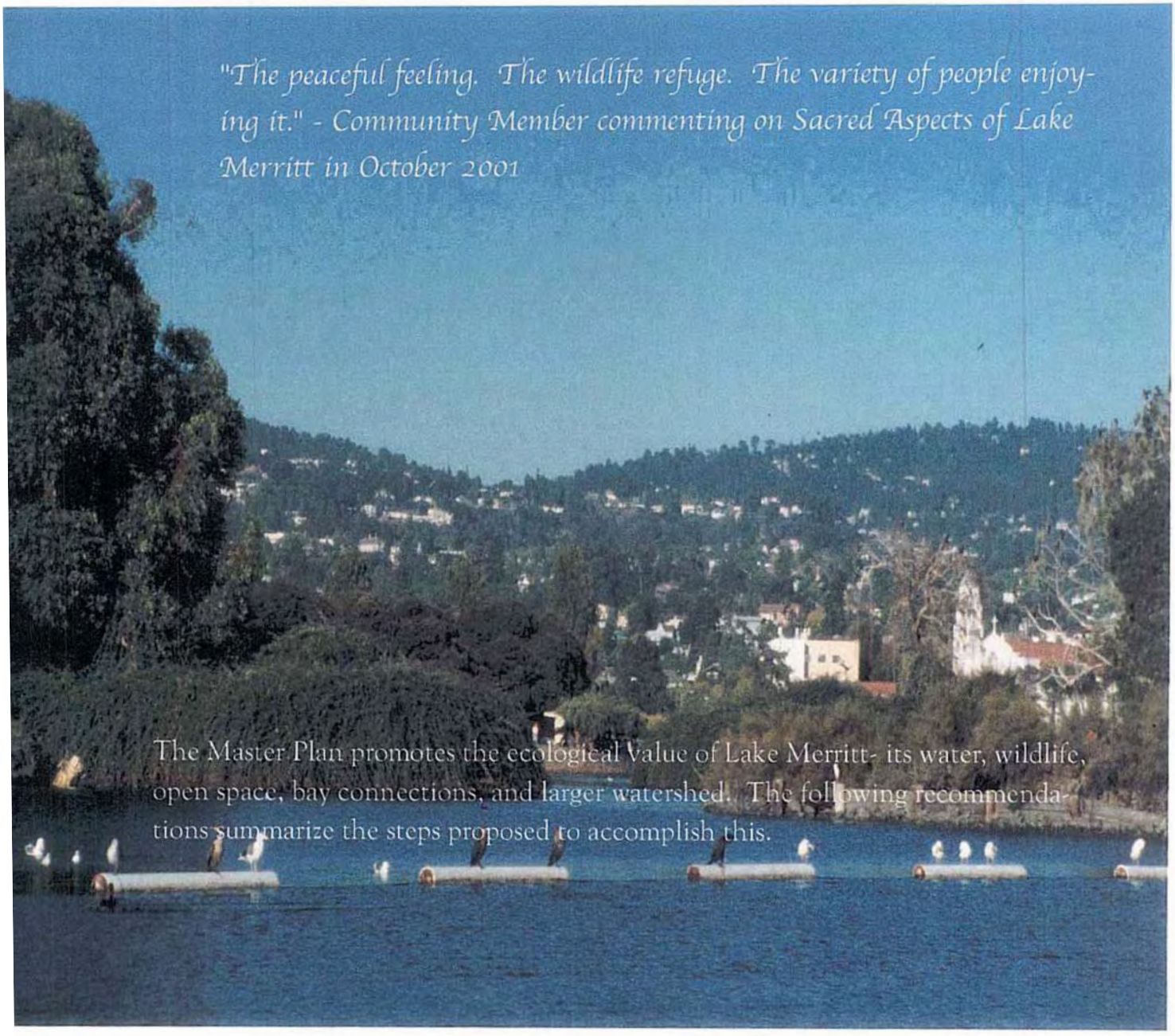
ECOLOGY



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Recommendations

Water Quality

1. Improve water quality by controlling pollution in the watershed. This should be accomplished by:

- A significant increase in enforcement of litter laws
- Continuous educational campaigns targeting businesses where litter is generated
- Educational and enforcement campaigns to eliminate waterfowl feeding
- See applicable activities on list of projects from water quality task force.

2. Control and remove trash that enters the Lake from storm drains and from the shoreline. This should be accomplished by:

- Installation of storm drain filters (CDS or other brand) five each year for 12 years
- Continuation of the Clean Lake Program to remove trash from the Lake.
- Building hook shaped "trash traps" into the shoreline at several locations when the bulkhead wall is replaced.

3. Improve water circulation in the bottom layer of the Lake by enhancing the connection to the estuary via the channel. This should be accomplished by:

- Forging an agreement with Alameda County to make tide gate closure decisions on a 12 hour basis.
- Removing the culvert condition at 12th Street and lowering the weir elevation to a point that maximizes water flow while minimizing disruption to recreational and scenic resources.
- Eliminating flow obstructions in the channel such as the culverts at 10th Street, the Flood Control Station (7th Street), the railway tracks and utility structures.
- Completion of a hydrology survey to recommend specific Lake water levels and alternatives for achieving these.
- Relocating the Alameda County pump facility to a location closer to the Lake and drawing water from the bottom of the Lake.

4. Provide for long term control of sediment, seaweed and plankton. This should be accomplished by:

- Continuation of algae and widgeon grass harvesting with establishment of several sanctuary areas
- Obtaining a small, city owned dredge boat (run by the harvester operator) to reduce the area of widgeon grass infestation and remove sediment around storm drains and docks
- Based on monitoring data, targets for reduction of nitrogen entering the Lake from creeks and storm drains should be established.

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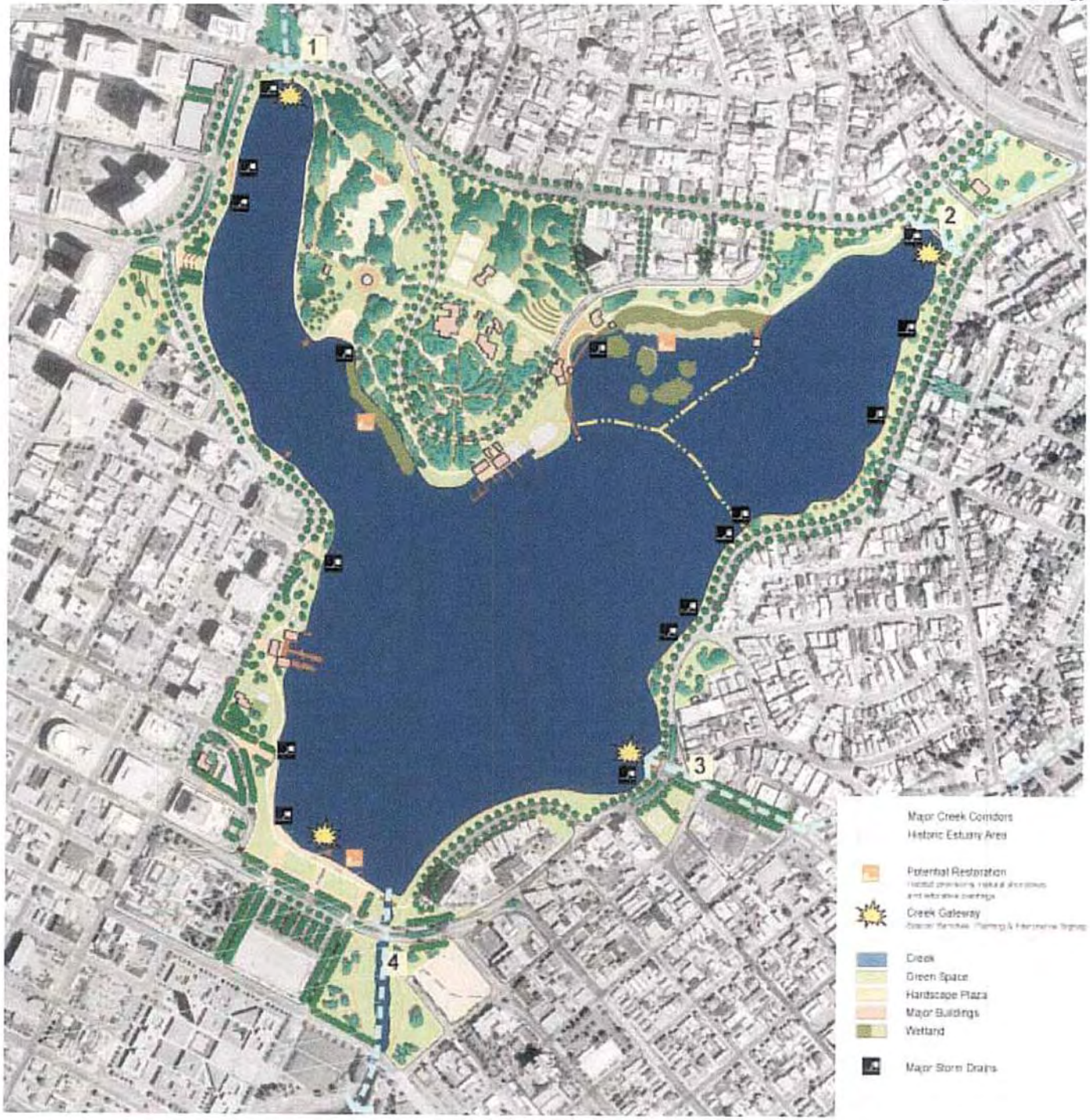
ECOLOGY

Figure III.26 Ecology



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Wildlife

1. Enhance specific areas for wildlife, including creation of a ecological zone in Lakeside Park (Shoreline Zone). This should be accomplished by:

- Moving the path away from the shoreline in key locations, creating a more natural (slight gradient) shoreline, relocating inconsistent uses such as parking lots, active playgrounds, and operations that are not waterfront dependent.
- Calming motor and pedestrian traffic near the duck pond by expanding walkways, and separating users
- Creation of a paved fresh water pond at the mouth of outfall # 1 by the Bandstand beach
- Creation of a wetland area by removing the center of one of the islands, depositing it around the shoreline, and creating a fresh water pond within the island
- Implementation of a habitat improvement plan on the islands
- Providing perches for birds on the water side of the perimeter bulkhead walls

2. Restore a managed, youth fishing program, beneficial to those from all areas of Oakland. This should be accomplished by:

- Accepting offers from the state Department of Fish and Game to stock steelhead trout and conduct "Fishing in the City" programs.
- Establishment of rules including "no fishing" zones in natural areas or where conflicts with other park users may occur
- Requiring completion of an educational program prior to obtaining a mandatory city fishing permit

3. Establishment of a policy that the wildlife refuge should be managed primarily for migratory waterfowl. This should be accomplished by:

- An educational campaign to eliminate public feeding of birds
- Management to reduce overwhelming concentrations of pigeons, resident geese, and similarly domesticated fauna

1 Glen Echo Creek

2 Pleasant Valley Creek / Trestle Glen Creek

3 E. 18th Street and Dock

4 12th Street / San Antonio Creek

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ECOLOGY

Goose Management

The unique balance between wildlife and human users at Lake Merritt is threatened by the large populations of geese. Both recreationalists and geese utilize the lawn areas of the park. The presence of fecal material from such high numbers renders the areas unusable for human recreation. Walkways, docks, bowling greens, and tables are also covered in goose excrement. This is especially problematic in areas where children congregate and during molting season (June to August). Geese feed on the mown lawns and are attracted by the visual openness. The geese typically congregate nearer the shoreline, however it is not uncommon to find them along Grand Avenue or in Snow Park.

The LMMP recognizes the need to review potential wildlife management practices to ensure that the notion of refuge is afforded to all. During the outreach process, many voices in the public expressed that geese are negatively impacting the park. As a significant ecological resource, Lake Merritt management should be sensitive to habitat provisions for wildlife. Practices should emphasize native avian species (shorebirds, migratory waterfowl) and fisheries. By implementing a range of techniques, domesticated wildlife such as geese should be brought into balance with other species and park uses.

Background Information ("Managing Canada Geese in Urban Environments")

- Canada gee se have undergone a significant population increase from a few thousand in 1965 to 1.1 million in 1996 in the central United States alone.
- Lake Merritt is not a historic site for large goose poulations. In the 1940's several crippled birds were released. Their numbers grew to about 75 in 1994. By 2001, a total of 1,093 birds were noted before fall migration. After migration, about 400 resident geese remained.
- Heavy concentrations of goose feces contain nitrogen which can lead to excessive algae growth in Lakes.
- High concentrations of geese increase the likelihood of avian disease to be transmitted between geese and other waterfowl.
- Migratory patterns have been researched and coordinated with habitat protection.
- Geese at LM molt in summer early June to late July-they are flightless during this time and concentrate along the shoreline. Numbers at the lake increase dramatically during this period causing increased conflicts with the park's most popular summertime use by humans.
- Geese prefer fertilized lawns to unfertilized ones and graze on the young grass shoots.
- Goose management programs to reduce the size of local flocks have been initiated at numerous sites in the Bay Area.

"Need to separate feeding and bird congregation areas from public paths where everybody walks." -Community Member commenting on geese at Lake Merritt in October 2001.

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Lake Merritt Site Conditions

- Studies have shown that geese excrete 10,000,000 fecal coliform bacteria per day. A total coliform count of 170,000 (unit unknown) was recorded near the bird islands in April, 2000.
- Open grass lawns near lake edge are populated with geese.
- Gatherings of 2-200+ geese are common.
- Fecal material covers all lawn areas inhabited by geese.
- Playground near Rotary nature Center has extensive fecal material.
- Accumulation of feathers is visible in the shallow water.
- Visitors feed and greatly enjoy the presence of geese.
- Nesting areas on the lake's shore are few- Geese are opportunists and will find small, protected spots in man made structures or high use areas. Natural lake edges like bluff segments in Lakeside may be used. Most successful nesting occurs on the refuge islands.
- Goslings appear on lake with adults during April.

Goose Habitat Conditions in Park

- Geese prefer open grassy areas where they feed on new grass growth.
- They tend to prefer park areas that are near or in sight of the lake.
- Geese require fresh water and congregate in areas of wet grass where available.
- Geese avoid areas frequented by dogs.

Goose Management Recommendations

Limit goose access in areas extensively used by people. This should be accomplished by:

- Initiating a Goose Management Study to determine the best practice techniques for reducing the impacts of geese on themselves, vegetation, other wildlife, and recreational users. This may involve commencement of a trial use of commercial Goose-Buster service to prevent geese from congregating in designated recreation areas during the summer.
- Creating a zone within Lakeside Park (Free and Open Space Zone) that emphasizes unimpeded use of lawn areas for informal recreation without disruption by goose fecal material.
- Eliminate the feeding of geese by park visitors.
- Reduction of grass and replacement with vegetative cover to that prevents grazing by geese in designated areas; increasing mowing height elsewhere.
- Establishment of vegetative visual and flight barriers to discourage geese from congregating in designated areas.
- Allowing on-sidewalk leashed dog walking per city park code.

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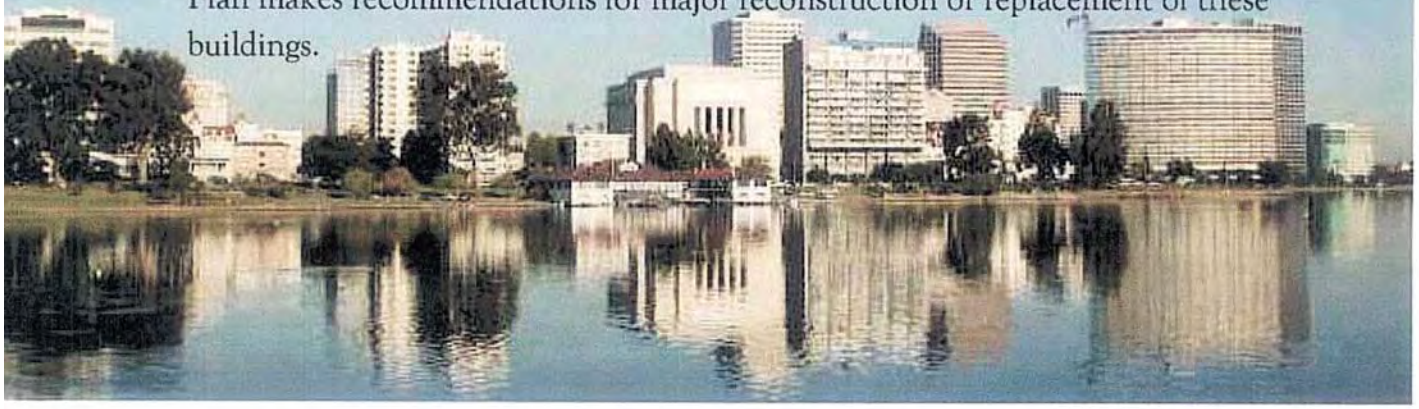
BUILDINGS

General Architectural Background

The buildings of Lake Merritt have evolved over a ninety year span, from the Municipal Boat House (originally constructed as the high-pressure salt water pumping station), to the recent Police Horse Stables. Understandably, there is a wide variety of styles, materials, scales, methods of construction, etc. in the architecture.

The buildings included in this study can be divided generally into two categories based on era of construction. The first era includes buildings constructed between 1909 and 1926: specifically, the Municipal Boat House, the Sailboat House, and the Lawn Bowling Clubhouse (and related outbuildings). The second era includes buildings originally constructed in the 1950's; the Rotary Nature Center, the Lakeside Park Garden Center, and the building which houses the Junior Center of Art and Science.

It should be noted that the Sailboat House and the Junior Center of Art and Science building have had major alterations during their history. in the case of the Sailboat House, the remodel has completley altered its appearance. The Master Plan makes recommendations for major reconstruction or replacement of these buildings.



Letter
B17
attach.

Extents of Study

The Lake Merritt Master Plan focuses on exterior form and appearance of existing buildings and makes suggestions for future construction. The eleven buildings included in this study are:

1. Municipal Boat House
2. Municipal Boat House Restrooms
3. Sailboat House
4. Sailboat House Restrooms
5. Sailboat House Storage
6. Lawn Bowling Clubhouse
7. Lakeside Park Garden Center
8. Rotary Nature Center
9. Junior Center of Art & Science
10. Police Horse Stables
11. Snack Bar

There are other significant buildings and structures in and around the Park which should be evaluated and be involved in any discussion of architectural character of the Park's structures. Specifically, these are:

12. Camron Stanford House
13. Glen Echo Pump House
14. Glen Echo Restrooms
15. Edoff Bandstand
16. Garden Center Restrooms
17. Corporation Yard
18. Gréenhouse and Lath house
19. McElroy Fountain
20. Geodesic Dome
21. El Embarcadero Landing Pergola
22. El Embarcadero Library
23. Library Restrooms
24. Pine Knoll Restrooms
25. Fire Alarm Building
26. Snow Park Restrooms

Letter
B17
attach.

BUILDINGS

Figure III.27 Buildings

Letter
B17
attach.

Architectural Goals and General Recommendations

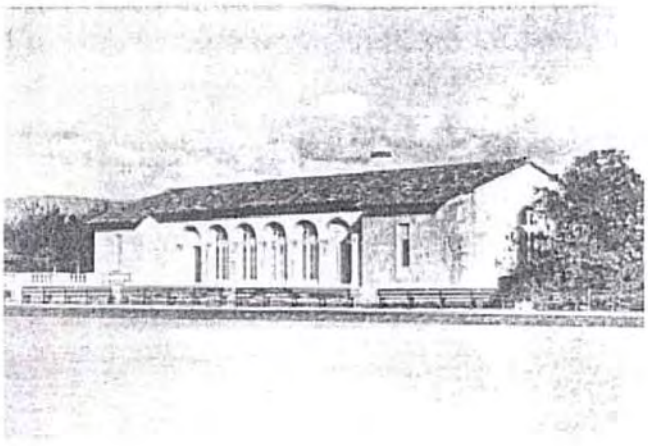
The Lake Merritt Master Plan makes four types of recommendations for the buildings included in the study.

1. Buildings to be revived/restored
2. Buildings to be rehabilitated/reconfigured
3. Buildings to be removed or relocated
4. New buildings

Buildings to be revived and restored include the Municipal Boathouse, and the Lawn Bowling Clubhouse. These are two of the defining buildings of Lake Merritt Park. They possess many inherent qualities which should be revived and encouraged. Restoration should be performed to the U.S. Secretary of the Interior's standards. Additions of poor quality should be removed or reconfigured in a manner which is sympathetic to the building's character, yet readily identifiable to avoid false historicism.

Buildings to be rehabilitated and reconfigured include the Sailboat House and the Lakeside Park Garden Center. While the Sailboat House will require major work to uncover the original character of the 1915 building, and integrate it with the site, the Lakeside Park Garden Center can be improved with a handful of discreet projects in key areas. The bulk of the building should remain intact.

Buildings which are intrusive, and detract from the Park should be removed or relocated. Two buildings which should be removed from the Park are the Police Horse Stables and the Snack Bar. A third, the building which houses the Junior Center of Art and Science (JCAS) should eventually, also be removed. A new building should be constructed to house the Junior Center of Art and Science, allowing the programs that this non-profit group offers to operate without interruption. This new building could also provide space to other educational programs and serve as a police sub station. In the interim, minor renovations to the existing JCAS building that improve its function and relate it to the park improvements are recommended



Letter
B17
attach.

BUILDINGS

General Building Recommendations

General architectural goals for new and existing buildings include:

1. To strengthen the relationship of the buildings to the landscape, using the buildings to help define outdoor spaces.
2. To strengthen the relationship between buildings by enhancing or introducing vistas, axes, etc.
3. To preserve key views and vistas around the Lake, and reinforce or establish view corridors where appropriate.
4. To enhance the sense of entry into the buildings.
5. To engage public interest with the buildings and invite interaction with the architecture, through introduction of courtyards, verandas etc.
6. To locate possible new buildings within the park, with the stipulation that there be no net increase to the overall ground coverage by buildings.
7. To provide a unified design theme for the two building types and new structures, this may take the form of materials, color palette, form, orientation, siting, etc.
8. To clearly identify building use through a unified signage program and where applicable, through use of materials, forms, and artistry.
9. To incorporate sustainable architecture, including use of recycled and environmentally friendly materials and methods.
10. To encourage passive systems for energy conservation wherever possible, and active systems, such as solar panels where not.
11. To provide accessibility to all buildings for people with disabilities.

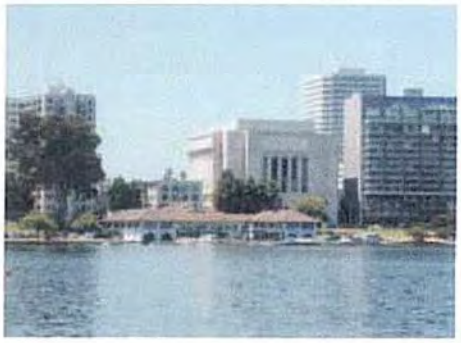
Letter
B17
attach.

Specific Recommendations for Future Buildings

1. Buildings should be of a civic scale, with monumental presence.
2. Architectural materials should be durable and solid, such as concrete or stone, to suggest permanence.
3. No new building should be more than two stories tall.
4. Accessory or secondary buildings should not overshadow or obscure primary park buildings.
5. New buildings should be sited on major circulation routes, as defined by the Master Plan.
6. Park buildings should be integrated into the landscape.

Opportunities for Future Study

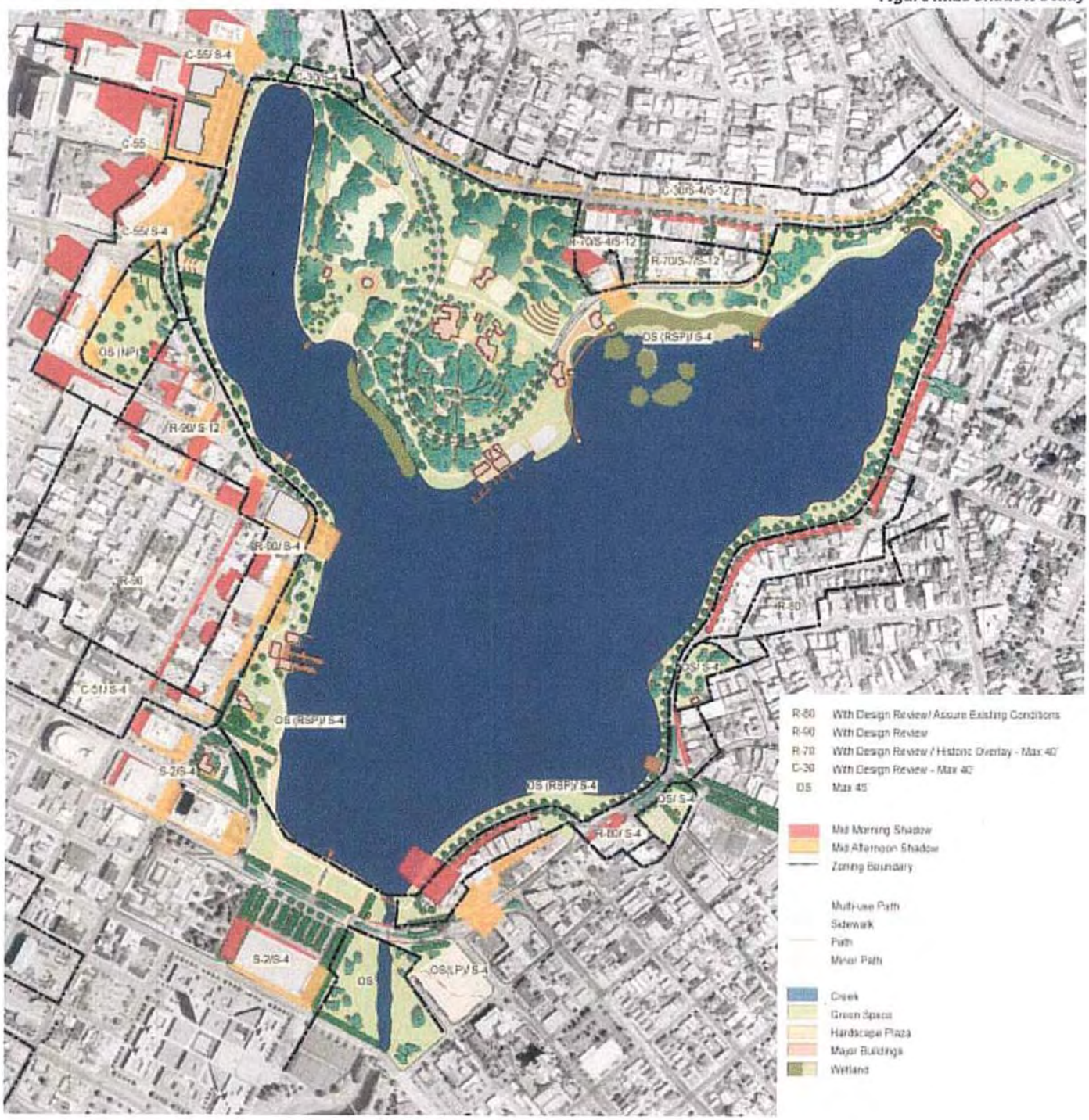
While the Master Plan does include façade improvement studies for existing buildings and thematic standards for future buildings, additional examination of the buildings should be performed as part of a complete study. This work might include seismic/structural, planning/use, mechanical/plumbing/electrical systems, hazardous materials, and accessibility compliance studies.



Letter
B17
attach.

SHADOW STUDY

Figure III.28 Shadow Study



Letter
B17
attach.

Sunlight Access and Shadow Study

Tall buildings are located on the perimeter of the Lake casting deep shadows into the parkland. This is problematic in that it reduces solar access for park users and disrupts the normal growing conditions for park vegetation. Furthermore, the imbalance of scale presented by these masses creates an uncomfortable sensory condition for those using the lawns, pathways, and benches nearby. This is further described in the Landscape section of this chapter though the use of panoramic photographs. The public has expressed concern for the negative impact of such structures, often characterizing the feeling as being "walled in." While the Master Plan presents no formal policy to non-park land use and massing, the effects are stated below. General recommendations are also stated to educate planners of future area buildings. No visual preference survey was completed during the planning process, however much public comment was received to substantiate this discussion.

Existing Conditions

- Buildings that cast continuous shade on the park (including Snow Park) for more than several hours each day negatively impacts vegetation growth.
- The blockage of afternoon/evening sunlight provides further negative impacts to park use and enjoyment.
- Groups of buildings form a continuous mass that can further block sunlight from reaching the park.
- Tall buildings (20+) floors standing alone are visually distracting when viewed from a distance (such as the several residential towers built around the Lake in the 1960's and 70's) .
- Four to twelve story residential buildings that have greater façade articulation and tall trees in the foreground generally provide a positive atmosphere. Examples of these are found on Lakeside near Snow Park and on Lakeshore Avenue.
- The view of tall buildings on the downtown edge are generally more scenic when viewed from across the lake as opposed to from the Downtown Park Edge due to the more comfortable scale relationship between people and buildings afforded at that distance.
- If heights were maximized per allowable zoning, the shade on park areas would be great (refer to figure III. on the facing page). Design review is required in most zoning areas of significant height.

General Recommendations

- New buildings should minimize interruption of sunlight into the Park.
- District zoning, design guidelines, and FAR regulations should consider building mass impact to park scale and sunlight access.
- Buildings should accommodate ample room for tall tree plantings in the foreground and along the street.
- The design review process required by most adjacent zoning should consider sunlight access and building mass impacts to the park and its users.
- The placement of new buildings should consider views to popular landmarks from the Lake Merritt park areas. These could include the County Courthouse, the Kaiser Convention Center, the Oakland Hills, St. Paul's Church, the Tribune Building, and others of visual importance.

Letter
B17
attach.

ART ELEMENT

The Lake Merritt Master Plan supports the City of Oakland's commitment to weaving arts and culture into the fabric of everyday life. Public art as an "element" of the park master plan maintains an openness of application. The art may include, singly produced objects, functional designs, a process of creation and collaboration, or an overall approach and design of a place. The art may be the product of individual artists' creativity or the result of collaboration between artists of different disciplines, designers, architects, and community members. The resulting condition can be a landscape of meaning and visual intrigue.

Through "Spotlight on the Arts", the Craft and Cultural Arts Department is seeking to establish Oakland as the center for artistic-cultural events and entertainment in the Bay Area. From downtown renaissance projects to the restoration of Lake Merritt, the opportunities to promote arts and culture are found throughout our city.

The LMMP recognizes opportunities for artists to reflect the unique environment, culture and social conditions of Oakland, its neighborhoods, history, natural resources, and people. The intent of the art element is to describe the many opportunities for integrating arts into the revitalization of the park. No specific projects are determined, nor is a single arts approach recommended. Rather, the master plan sets the thematic and programmatic content of the Lake Merritt Park art element. The plan then acts as a guide to shape the artistic exploration of concepts and projects as part of the art element. This chapter describes the opportunities and highlights the guidelines.

Letter
B17
attach.

Opportunities

Art Element Overview

Environmental Art

Natural conditions/processes should be recognized as a basis for site design and restoration. The landscape -more specifically, the art element-should integrate ecology as a function of the park and provide a means of its interpretation. Suitable locations for this type of expression could include the shoreline restoration in Lakeside Park; creek daylighting in Eastshore Park; other creek nodes, bird perches, storm drain filter covers, etc.

Designed Elements

Artists and craftspeople should be included to provide aesthetic input on functional elements in the park. Elements could include railings, fences, docks, botanical garden entries and perimeter fencing, neighborhood nodes (paving, seatwalls); historic markers and signage, entire promenades, low retaining walls, sections of the perimeter path, etc.

Collaborative Design Process

Many successfully designed and built projects are the result of collaborations between artists and designers. The process requires the partnership and collaboration of minds to conceive and execute such a work. Such an effort obscures the line between landscape and art, between meaning and aesthetic. Any improvement project is applicable to this process including zones or spaces within the park; entrances, nodes, and gateways; buildings recommended for restoration, remodeling or new construction; and park amenities.

Environment for Display

In addition to the incorporation of art as a design process, the lake and park offers a unique setting for the display of permanent and temporary sculptural work. The civic district of the park- stretching from 14th Street to the Estuary- is a potential area for sculpture display. Specific sites include the new 12th Street park area, the Fire Alarm Building Site, and the plaza at the 14th Street terminus. The Oakland Museum is recognized as a potential partner in the sculpture component and arts zone overlay.

Letter
B17
attach.

ART ELEMENT

Ecology

The art element should reinforce the park's ecological heritage and potential. By highlighting the creeks, watershed, habitat zones, and natural systems, the story of ecology can be made evident.

Education

An understanding of natural processes, horticultural diversity, cultural heritage, and the history of Lake Merritt can be reinforced through the application of the art element. The plan describes several methods for application under Opportunities.

Recreation

The park is used by many as a place for recreation. Provisions for these movements could be explored through the art element. For example, park amenities such as benches, signs, or walls, could combine exercise functions into their design; pathways could mark the pace or distance traveled of a jogger. The components could be artistically designed to serve a multipurpose role in the park.

Culture

Culture is an underlying theme to all aspects of the master plan. Oakland's urban form, social composition, ecology, history, and present activities each shape the notion of local culture. The art element can reflect the unique character of Oakland, its peoples, neighborhoods, built form, history, and natural environment.

Letter
B17
attach.

Art Element Recommendations

- The art element should be compatible with and enhance ecology/resource sensitivity.
- The art element should enhance the historic, cultural, aesthetic, and interpretive potential of the park and support the park program and management per the master plan and the department of Parks and Recreation.
- The art element should conform to applicable design guidelines for functional park elements, while enhancing the aesthetic and educational possibilities of these necessary amenities.
- The art element should consider maintenance requirements and minimize the need for specialized practices.

LETTER B17
John Wilson
September 11, 2007

Response B17-1: The Lake Merritt Master Plan was considered in developing the proposed project design and is described on page 94 of the Draft EIR. A section of the plan is attached to the comment letter. The Measure DD-funded activities would address many of the goals identified in the Master Plan, including the forestry, water quality, and architectural recommendations included in the section submitted with the comment. Chapter V, Alternatives, of the Draft EIR describes a "lid park" alternative for the 12th Street roadway construction, which was evaluated as part of the Lake Merritt Master Plan. As stated on page 348 of the Draft EIR, this alternative was identified as undesirable by community members and the design team due to several factors including: no direct estuary pedestrian connections were possible; tidal flow was not improved from the current conditions; the structure would not enhance shoreline access; and the cost to build the structure was not justified by the benefits. As such, this alternative was not evaluated in the Draft EIR.

Letter
B18

From: notify@yahoogroups.com on behalf of eliseackerman
[eliseackerman@yahoo.com]
Sent: Tuesday, September 11, 2007 3:05 PM
To: Thornton, Elois
Subject: EIR for Measure DD

Hi there,

Please take a look at the intersection of Harrison Street, Bay Place and 27th Street. It is already an extremely dangerous intersection with an accident or a close call happening about once a week. The Whole Foods that will open at the end of the month will exacerbate the problem. **1**

One block up the road, where Orange merges into Harrison, is also extremely dangerous. Motorists are confused by the configuration of the islands and drive down the wrong side of the street several times a day. **2**

Elise Ackerman
306 Oakland Avenue

LETTER B18
Elise Ackerman
September 11, 2007

Response B18-1: The 27th Street/Bay Place/Harrison Street intersection was evaluated in Section IV.C, Transportation Circulation and Parking of the Draft EIR. The text on page 115 of the Draft EIR notes that under existing conditions this intersection operates at LOS F during the AM peak hour. The text on page 124 of the Draft EIR (Impact TRANS-4) notes that implementation of the Lake Merritt and Lake Merritt Channel project components would result in significant impacts at this intersection, under the existing plus project conditions. The average vehicle delay at the 27th Street/Bay Place/Harrison Street intersection would increase by 4.6 seconds during the AM peak hour. Mitigation Measure TRANS-4 in the Draft EIR recommends optimizing the signal timing at this intersection to reduce the total intersection average vehicle delay by 49.9 seconds during the AM peak hour. Although with mitigation the intersection would remain at LOS F, it would operate at a total average vehicle delay that would be 45.3 seconds lower than the delay with no project and no mitigation. The increased delay and decreased LOS would not increase the hazard at the intersection – reduced traffic speeds would lower the safety risk at the intersection. It is also noted in the Draft EIR that under cumulative conditions, the proposed project would have a less-than-significant impact on this intersection (see page 134).

Response B18-2: The intersection identified in the comment is not part of the project area.

Letter
B19

From: Barton Mayhew [bmayhew03@yahoo.com]
Sent: Tuesday, September 11, 2007 1:38 PM
To: Thornton, Elois
Cc: harrioak@yahoogroups.com; rbishop747@aol.com
Subject: Measure DD draft EIR Comments

Ms. Thornton: I am responding to the "Measure DD draft EIR" affecting the intersections and crosswalks around, nearby, and/or adjacent to Harrison Street, Bay Place, and 27th Street. Due consideration needs to be included regarding pedestrians and cyclists, and vehicle traffic configurations on and near these public streets, and walkways. Safety for pedestrians and cyclists especially needs to be emphasized first and foremost. Any changes in design, construction, or installation of controls should benefit people on foot or bicycle over and above vehicle movement. In other words, pedestrians and cyclists should be the primary concern for environmental impact alterations. Restrictions on vehicles, and provision for pedestrians and cyclists is mandated by state and local laws. Please apply highest standards for residents and visitors to this area of Oakland. **1**

Barton Mayhew, on behalf of traffic safety committees, Harrioak Neighborhood Association, and Westlake Community Coalition

LETTER B19
Barton Mayhew
September 11, 2007

Response B19-1: The design of the 27th Street/Bay Place/Harrison Street intersection is not part of the proposed project. Impacts to the intersection resulting from implementation of the proposed project are discussed in Section IV.C, Transportation Circulation and Parking of the Draft EIR. See response to comment B18-1 for the identification of level of service operation at the 27th Street/Bay Place/Harrison Street intersection.

As stated on page 139 of the Draft EIR, the Lake Merritt and Lake Merritt Channel group would not conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation. The project is consistent with the adopted Oakland Bicycle Master Plan (see Figure IV.C-5 of the Draft EIR for the most recent update) and Pedestrian Master Plan. It would improve bikeway connectivity and pedestrian access around Lake Merritt and along the Lake Merritt Channel and would complete linkages along the Oakland waterfront. No impacts to pedestrian or bicyclist safety were identified in the Draft EIR at the 27th Street/Bay Place/Harrison Street intersection under the City's significant criteria for the evaluation of environmental impacts.

Letter
B20

From: Catherine McBride [cmcbride@pacbell.net]
Sent: Tuesday, September 11, 2007 5:07 PM
To: Thornton, Elois
Subject: Fw: Measure DD EIR comments
Hi - don't know how these got dated 10-11 at 3:54 but I sent them today, 9-11, at 3:54 in hopes of making the deadline. Sorry and thanks - Catherine McBride

1

----- Original Message -----
From: Catherine McBride
To: Eathornton@oaklandnet.com
Sent: Thursday, October 11, 2007 3:54 PM
Subject: Measure DD EIR comments

Re: Harrison Street/Bay Place/27th Street traffic and Whole Foods impact on Measure DD.

A traffic test on use of the Whole Foods (WFs) loading dock, attended by neighborhood residents, WFs management staff, truck company management, and city staff and planners proved that:

1) WFs semi-trucks (even larger trucks are planned for future use) block the Harrison Street sidewalk and pedestrian traffic when using the loading bay and turning in/out of WFs.

2) WFs semi-trucks extend onto Harrison Street by several inches when using the loading bay.

2

3) The Harrison Street sidewalk parallel to WFs is extremely narrow even when accessible to pedestrians.

4) WFs trucks entering/exiting the loading bay cause traffic back-ups which stop traffic on Harrison Street in both directions since traffic must be stopped on all of Harrison to allow for the difficult maneuvering of large trucks into/out of the loading bay. WFs semi-trucks will be using the loading bay during drive time peaks due to municipal delivery time restrictions.

5) The are thousands of seniors who live in St. Paul's Towers, in the 4 apartment buildings located near Broadway/27th, the Downtown Senior Center located in the Veteran's Memorial Building - and no changes have been made to traffic safety islands, timing of crosswalk lights, or any other "slow pedestrian" safety needs. Family use these same streets and crosswalks when using the Lake Merritt facilities.

3

In summary, the opening of Whole Foods at the end of this month; the increased development of residential condos on Broadway; the high population of senior citizens; the development of the new cathedral; the expansion and development of Kaiser medical services; and the possible and DREADED development of lakeside condos (NO, NO!) when considered with Measure DD changes make for massive traffic problems for the Harrison Street/Oakland Avenue corridor that been in no way addressed or resolved in an integrated manner.

4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20

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4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20
cont.

Coalition, I submit these comments. I do not speak for these groups but we have struggle with these issue over many years.

Thank you,

Catherine McBride
242 Frisbie Street
Oakland, CA
94611
510-465-6605
District Three

LETTER B20
Catherine McBride
September 11, 2007

Response B20-1: This introductory comment, which states the correct date of comment submission, is noted. The comments submitted were received in time and are considered in this Response to Comments Document.

Response B20-2: The comment provides an opinion of traffic hazards at the 27th Street/Bay Place/Harrison Street intersection associated with the Whole Foods project and is noted. Also see Response to Comment B18-1.

Response B20-3: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response B20-4: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted.

Letter
B21

Inlandboatmen's Union of the Pacific
MARINE DIVISION -- INTERNATIONAL LONGSHORE & WAREHOUSE UNION
NATIONAL OFFICE • 1711 W. NICKERSON ST., STE D • SEATTLE, WA 98119 • (206) 284-6001 • FAX (206) 284-5043

San Francisco Regional Office 450 Harrison Street, San Francisco, CA 94105 415-896-1224
FAX: 415-896-1226

FAX COVER SHEET

6538

TO: Elois A Thornton FAX: 510-238-~~3944~~

Planner IV DATE: 9-5-07

City of Oakland - Comm + Econ Dev. Agency

FROM: **Marina V. Secchitano, Regional Director**

RE: Opposed to pedestrian walkway on Bridge faces

Number of pages including cover sheet: _____

Message: Our Captains are very concerned about the safety of this proposal.

Please see letter attached —

Marina V Secchitano

1

2

REGIONAL OFFICES

PUGET SOUND
W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5040
FAX (206) 284-5043

REGION 37
1711 W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5321
FAX (206) 284-5043

COLUMBIA RIVER
2435 NW Front Ave
Portland, OR 97209
(503) 226-6000
FAX (503) 223-2556

SAN FRANCISCO
450 Harrison Street
San Francisco, CA 94105
(415) 896-1224
FAX (415) 896-1226

HAWAII
1001 Dillingham Blvd., Rm 217
Honolulu, HI 96817
(808) 847-0611
FAX (808) 847-9051

SOUTHERN CALIFORNIA
1911 N. Gaffey, Ste. A+B
San Pedro, CA 90731
(310) 521-9003
FAX (310) 521-9094

KETCHIKAN
Post Office Box 6300
Ketchikan, AK 99901
(907) 225-6360
FAX (907) 225-8656

JUNEAU
3017 Clinton Drive, Ste 201
Juneau, AK 99801
(907) 790-9544
FAX (907) 790-9545

Letter
B21
cont.

NORTHERN CALIFORNIA DISTRICT COUNCIL – ILWU

1188 FRANKLIN STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 775-0533

AFFILIATED
ILWU LOCAL UNIONS:

Local 6 Warehousemen:
San Francisco
Stockton
Oakland
Redwood City San Jose
Crockett Richmond
Salinas

Local 10 Longshore
San Francisco

Local 14 Longshore
Eureka

Local 17 Warehouse
Broderick

Local 18 Longshore
West Sacramento

Local 34 Shipclerks
San Francisco

Local 54 Longshore
Stockton

Local 75 Watchmen
San Francisco

Local 91 Walking Bosses
San Francisco

IBU Marine Division
San Francisco

September 5, 2007

Attention: City of Oakland Planning Commission:

We have reviewed your Draft Environmental Impact Report and are very supportive of the overall intent of the project. A waterfront trail is a positive way for the community to access the waterfront and all its unique activities. **3**

Extending the Waterfront Trail around the bridge faces into navigable waterways would interfere with maritime activities. Both the Park Street Bridge and the High Street Bridge are narrow and congested with other vessel traffic, recreational boaters, etc. Currently, all the space available is needed to ensure that the commercial vessel maneuvers can be performed safely. We believe this portion of the plan is a conflict with Policy W2.6, as it unnecessarily endangers public safety, as well as interfering with maritime activities.

Some of our ILWU Captains have over 30 years experience on this route delivering sand and gravel to the Hanson Yard under all kinds of conditions and feel strongly that the implementation this part of the plan would jeopardize the safe transit of their tugs and barges through the bridges. **4**

Waterborne transit is an environmental friendly way to move products, and it reduces the amount of trucks necessary on the roadways. To replicate the volume of aggregate being delivered would result in thousands of truck transits a year added to the Bay Bridge and the community. The ILWU has been working in a partnership with the Oakland community to improve the air quality. While we support the Waterfront Trail, we ask that the City work to make sure that our navigational waterway is not impeded by the incursion of the pedestrian trail around the bridges.

In closing, we note that there are many good union jobs at stake. If it is necessary to close this facility we deliver to because we can't safely get through the bridges, this will result in the loss of many good union jobs with health care for our families and good pensions. **5**

Please redraft this part of the plan regarding the Waterfront Trail. **6**

Sincerely,

Marina V. Secchitano
Vice President

MVS/lk
cwa39521

LETTER B21
Inlandboatmen's Union of the Pacific
Marina V. Secchitano, Vice President
September 5, 2007

Response B21-1: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-2: The comment, which expresses concern with the safety of the proposed project, is noted. Refer to Response to Comment A8-1.

Response B21-3: The comment, which expresses support for the proposed project, is noted.

Response B21-4: Refer to Response to Comment A8-1.

Response B21-5: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-6: Refer to Response to Comment A8-1.

Letter
B22

From: Bishop, Mike (Oakland) NA [Mike.Bishop@hanson.biz]
Sent: Monday, September 10, 2007 10:25 PM
To: Thornton, Elois
Subject: Measure DD Draft EIR
Please see attached comments to Measure DD Draft EIR.

Mike Bishop
Marine Operations Manager
Northern California
Hanson Aggregates
(510) 261-8573

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates
4501 Tidewater Avenue
Oakland CA 94601
Tel. 510 261-8533
Fax. 510 534-7418

September 10, 2007

Attention: City of Oakland Planning Commission

Subject: Draft EIR for Implementation of Measure DD projects – Oakland Waterfront Trail and Access Improvements

Lack of Public Out-reach:

- Hanson is in favor of the concept of creating public access to the waterfront and has been involved in the process over the last 3 years. That said the public out-reach for this EIR has been very limited, as a stakeholder and a participant we have had very little contact with the process over the last two years. The scope of the project was brought to our attention by the US Coast Guard and that was by the time the EIR project was well underway. There was no notification of the scoping meeting received for stakeholders. There was no invitation to comment or participate during the EIR process. This Draft EIR encompasses a huge scope and I do not believe the out reach to the public has been very encompassing to alert the public of the impacts of these projects. **1**

Group 2 Alternatives – Waterfront Trail Surface Street Connection Alternative (Group2)

- This alternative failed to mention that eliminating the boardwalks under the bridges, specifically the High St Bridge and the Park St Bridge would also reduce the impacts to navigation under these bridges. Reducing the navigational channel under these bridges may severely impact current and future barge traffic that currently use the estuary. This point was not address in this Draft EIR. **2**

Table II-1: Summary of Impacts and Mitigation Measures – A. Land Use (Group2)

- This Draft EIR does address the need for safe access along the waterfront on the Hanson Aggregates lease. What it has omitted is how complex this issue is. In preliminary meetings in 2004 several designs and discussions were considered as to how the Bay Trail may safely access the working waterfront site at Hanson. There was no conclusion drawn at that time and the one proposed in this Draft EIR is far from adequate. Discussed at that time was the overall poor condition of the concrete pier in which the path would be on as the path crossed the Hanson lease, the Draft EIR does not address this issue. It does not address the impacts the trail would have on the barge unloading operations at this location either. **3**

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

As stated Hanson Aggregates is in favor of the Bay Trail and conceptually routing it over property that is leased. These comments are to address the omissions in the Draft EIR in regards to the impacts on our environment, operations and business as they are today. 4

Regards,

Mike Bishop
Marine Operations Manger
Hanson Aggregates

LETTER B22
Hanson Aggregates
Mike Bishop, Marine Operations Manager
September 10, 2007

Response B22-1: Refer to Response to Comment B4-1 for a general description of the process that was used to notice the Draft EIR. In addition, Joel Peter, Program Manager for the Measure DD Project, e-mailed Mr. Hanson on August 10, 2007 to notify him of the availability of the Draft EIR.

Response B22-2: The comment correctly states that the proposed Waterfront Trail Alternative notes that eliminating the boardwalks under the bridges would also reduce the impacts to navigation under these bridges. While the City did not find the impedance of marine shipping to be a significant effect under the City's significance criteria (Refer to Response to Comment A8-1), the City recognizes that the U.S. Coast Guard and the marine shipping community oppose the undercrossings of the bridges on the Oakland Channel and that the U.S. Coast Guard might not be willing to issue a permit for the proposed undercrossings. The text on page 357 of the Draft EIR is revised as follows:

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree than the proposed project. All objectives for the Lake Merritt and Lake Merritt Channel, the Recreational Facilities, and the City-Wide Creeks Groups would be met. <u>It is being considered, in part, because the U.S. Coast Guard and the marine shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail and because the U.S. Coast Guard has permitting authority in this area.</u> The alternative would complete the missing segments of the San Francisco Bay Trail along the Oakland Estuary, albeit with segments that would not be constructed on the waterfront but rather on nearby streets. Because the trail would avoid contaminated properties, hazardous waste impacts associated with these properties would not occur but the properties would also not be remediated, one of the objectives of this project group. The alternative would support some of the objectives of OSCAR and the Estuary Policy Plan by completing a linear trail along the waterfront; however because the segments would be completed away from the shoreline in some cases, the alternative would not create as much physical and visual access to the Oakland shoreline as the proposed project.

Response B22-3: On page 57, the Draft EIR acknowledges that crossing the Hanson Aggregate facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time and the text on page 57 of the Draft EIR is revised as follows:

(14) Gallagher & Burk/Hanson Aggregate Trail Connection. The proposed segment of the trail adjacent to the Gallagher & Burk asphalt plant would be a concrete pier supported walkway. As the Hanson Aggregate facility uses water access for delivery of materials, the trail would be designed to allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail. Property easements are being sought for this segment of the trail, but operational constraints may preclude completing this segment of the trail while the facility is in operation. An interim route may include a connection to Tidewater Avenue, which is analyzed in the Section V, Alternatives.

Response B22-4 The comment, which pertains to the merits of the project, is noted.

Letter
B23

GALLAGHER & BURK INC.
PAVING GRADING
OAKLAND, CALIFORNIA

LETTER OF TRANSMITTAL

344 High Street Oakland, CA 94601
Tel. 925-829-1446 Fax 925-829-8174

TO: City of Oakland
Community & Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza
Suite 3315
Oakland, CA 94612

Attn.: Elois A. Thornton

DATE	JOB NO.
08/27/07	

RE: City of Oakland Measure DD

WE ARE SENDING YOU: ☒ Attached ☐ under separate cover via: _____ the following items;

☐ Quote ☐ Specifications ☐ Plans ☐ Insurance Requirements ☐ Samples
☐ Change Order ☐ Copy of Letter ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	08/22/07	1	Comments regarding the City of Oakland Measure DD
			Implementation Project, Environmental Impact Report

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO Bob McCarrick
File No. 58004 Pedestrian Trail

SIGNED: Vicki Duma

If enclosures are not as noted, kindly notify us at once.

Letter
B23
cont.

GALLAGHER & BURK, INC.
PAVING & GRADING CONTRACTORS LICENSE NO. 141140A
344 HIGH STREET • P.O. BOX 7227 • OAKLAND, CALIFORNIA 94601
(510) 261-0466 • FAX (510) 261-0478

August 22, 2007

Subject: City of Oakland Measure DD
Implementation Project
Environmental Impact Report
State Clearinghouse #2006122048
Public Review Draft
Prepared by LSA dated July, 2007

To Whom It May Concern:

Gallagher and Burk has been a major contractor and employer in the City of Oakland since 1946, with offices at 344 High Street. Our asphalt concrete plant, located at our Tidewater address serves the infrastructure maintenance needs of the greater Oakland area, including the Port of Oakland's maritime and airport facilities.

We have reviewed a copy of the above referenced document and have concerns about the logistics and safety aspects of combining public access with industrial activities. As traffic and air quality issues become an increasing concern, we expect to supply the raw materials to our asphalt plant by water access. Paragraph 14 "Gallagher & Burk/Hanson Aggregate Trail Connection" on page 57, describes the adjacent trail being installed as a concrete supported walkway. The intent is to "allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail."

1

It is unclear to us how safety and access will be controlled. It is likely that we will be burdened with extraordinary costs of equipment and operations due to the issues related to public access. We request that these issues be addressed, including controls of public access and reimbursement of additional costs that our facility will incur.

We look forward to your attention to these matters, which are of grave concern to the long-term operation of our facility. If you have any questions or need additional information, please contact me.

Very truly,

Alan French
General Manager
Gallagher & Burk Materials Division

cc: Bob McCarrick

LETTER B23
Gallagher & Burk Materials Division
Alan French, General Manager
August 22, 2007

Response B23-1: Economic impacts (either at the "macro" level of the City, or at the "micro" level of the individual private business) do not fall under the definition of environmental impacts in CEQA and therefore are not discussed in detail in the Draft EIR. The Draft EIR correctly focuses on the physical effects of the project, which include land use conflicts and safety. These effects are discussed on page 81 of the Draft EIR and mitigation is proposed that would reduce the effects of the project to less-than-significant levels. Nevertheless, on page 57, the Draft EIR acknowledges that crossing the Gallagher & Burk facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time. Refer to Responses to Comment A8-1, B22-2, and B22-3.

Letter
B24

From: JSASAY@up.com
Sent: Monday, September 10, 2007 3:32 PM
To: Thornton, Elois
Subject: Comments on Lake Merritt Channel Measure DD DEIR

I am attaching Union Pacific Railroad Company's letter with comments concerning the Draft Environmental Impact Report.

(See attached file: Lake Merritt DEIR Comment Letter.pdf)

****

Jeff S. Asay
Senior Counsel - Western Region
Union Pacific Railroad
10031 Foothills Blvd., Suite 200
Roseville, CA 95747
(916)-789-6217.

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Letter
B24
cont.

UNION PACIFIC RAILROAD COMPANY

LAW DEPARTMENT
10031 Foothills Boulevard, Suite 200, Roseville California 95747-7101
(916) 789-6400 Facsimile (916) 789-6227

JEFF S. ASAY
Assistant General Solicitor
Direct Line: (916) 789-6217

September 10, 2007

Community and Economic Development Agency
Planning Division
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Attn: Elois A. Thornton, Planner IV
(email: eathornton@oaklandnet.com)

Re: **Measure DD Implementation Project**
Lake Merritt Channel Improvements
Draft Environmental Impact Report
Case No. ER 06-0017

Comments Concerning Draft EIR

Dear Planning Division:

Union Pacific Railroad Company submits the following comments with respect to the Draft Environmental Impact Report identified above dated July 20, 2007.

The DEIR identifies the project boundaries as extending to the Union Pacific Railroad Company right of way and main line on the south end of Lake Merritt Channel. It is not possible from the maps in the DEIR to determine if the boundary encroaches into UPRR's right of way at that location. UPRR strongly objects to any designation of project boundaries that includes our right of way and trackage at this location. UPRR requests that the FEIR state definitely that the project boundary does not encroach on UPRR right of way between the main line and I-880. 1

Letter
B24
cont.

UPRR's right of way at this location contains triple tracks for the main line south and east from central Oakland and the Port of Oakland. This main line handles numerous passenger and freight trains on a daily basis. UPRR must retain the entire width of the right of way at this location for main line trackage and train operation. No part may be released or sold for improvements to Lake Merritt Channel. **2**

Further, UPRR has entered into an agreement with Caltrans relating to the seismic retrofit of Interstate 880 at this location. Pursuant to this agreement, UPRR will construct a third main line track on the north side of its right of way, utilizing available width at this location. The addition of this new third main track will require construction of a new railroad bridge across Lake Merritt Channel matching the elevation of the existing railroad bridges. Therefore, no encroachment of the Lake Merritt Channel on the railroad right of way will be entertained or permitted at this location. **3**

Please revise the DEIR accordingly, noting that project boundaries must not encroach on UPRR right of way and must not extend south of the north right of way line of the UPRR. It should also be noted that further expansion of the Lake Merritt Project south of the railroad must take into account the fact that the location and elevation of the existing and planned railroad bridges. **4**

Please contact the undersigned if more information is needed.

Very truly yours,

Jeff S. Asay

/amm

LETTER B24
Union Pacific Railroad Company
Jeff Asay, Senior Counsel – Western Region
September 10, 2007

Response B24-1: Refer to Response to Comment A7-1.

Response B24-2: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided.

Response B24-3: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided. Refer to Response to Comment A6-1.

Response B24-4: Refer to Response to Comment A7-1.

STEEFEL, LEVITT & WEISS
A Professional Corporation

Letter
B25

September 14, 2007

19869

VIA E-MAIL (*EAThornton@oaklandnet.com*)

Elois A. Thornton, Planner IV
Community and Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza, Ste. 3315
Oakland, CA 94612

Re: Union Pacific Railroad Company's Comments on
Draft EIR for Measure DD Implementation Project, SCH #2006122048

Dear Ms. Thornton:

We represent Union Pacific Railroad Company ("UP"). By this letter, UP augments its letter to you dated September 10, 2007 and further presents its comments on the Draft Environmental Impact Report ("Draft EIR") for the Measure DD Implementation Project (the "Project"). 1

The Project seeks to implement Measure DD, a municipal bond measure passed by Oakland voters in 2002 that authorizes the City of Oakland (the "City") to issue bonds that fund physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreational facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restorative activities. The Project is divided into four implementation groups located throughout the City: (1) Lake Merritt and Lake Merritt Channel Improvements (Group 1); (2) Oakland Waterfront Trail and Access Improvements (Group 2); (3) North and East Oakland Recreational Facilities (Group 3); and (4) City-wide Creeks, Restoration, Preservation and Acquisition (Group 4).

Located adjacent to or otherwise near the Project sites are UP's railroad yard, a railroad line and right-of-way in Oakland (the "UP Line") that roughly parallels the I-880 freeway. As a result of this close proximity, the development or improvements proposed by the Project are likely to impact the UP-Line and rail services. 2

By this letter, UP brings to the City's attention its concerns regarding traffic, safety, trespassing, vibration, and mechanical odor. Based on our comments below, UP respectfully requests that the City analyze these impacts associated with the Project's location near the UP Line and require appropriate mitigation measures to reduce those impacts.

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

1. Background on UP

Many people know about UP's distinguished history. UP played a prominent role in the development of the first transcontinental railroad in the late 1860's. What many people do not know is that today, UP remains a significant owner of railroad property and a major freight transporter in the western two-thirds of the United States. In fact, UP is the largest railroad company in North America.

Of particular relevance to the Project, UP owns a railroad yard, railroad line and right-of-way immediately adjacent to or near the Project sites. UP operates freight services, and Amtrak operates passenger services, on the UP line. The UP line experiences a very high volume of rail traffic, as it serves the entire metropolitan Bay Area and is a major transportation corridor through Northern California. **3**

Given UP's significant presence in and around the City of Oakland, UP takes great interest in the City's growth and improvement. It is with this perspective that UP respectfully submits the comments in this letter.

2. Traffic

Many of the concerns specific to the Project, including, but not limited to, a concern about traffic, arise from the associated increase in population within the close proximity of the UP Main Line. Specifically, the Project proposes, in connection with Group 3, the construction of an East Oakland Sports Complex at the corner of Ednes and Jones Avenues. This component of the project proposes a 150,000 square foot addition to and expansion of the existing Ira Jinkins Park/Recreation Center (the "Center"). (Draft EIR, p. 57.) The facility is anticipated to include a 25-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley.

The UP Line crosses several roadways at-grade to the immediate east of the Center, including, but not limited to, the at-grade crossings at 85th Avenue and 98th Avenue. A natural consequence of the expansion of the Center will likely be an increase in the number of people going there to enjoy the new recreational benefits. In turn, there will also likely be an increase in traffic volumes in and around that area, including the existing at-grade rail crossings. Traffic spillover effects may further increase vehicle trips over the at-grade crossings, as motorists attempt to take short cuts to avoid congestion along primary traffic aterials. Additional vehicle trips and traffic congestion could negatively impact at-grade rail crossings in the area by increasing the chance of train-vehicular conflicts, thereby raising an obvious safety issue. **4**

UP therefore urges the City to further analyze the Project's potential impacts on traffic inasmuch as they relate to rail safety and operations along the length of the right-of-way, and traffic flow at at-grade rail crossings near the proposed East Oakland Sports Complex, including, without limitation, those at 85th Avenue and 98th Avenue. UP's operations must not be affected

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

by greater traffic and potential congestion at at-grade crossings and, thus, adequate mitigation measures should be implemented. Possible mitigation measures include construction at the developer's expense of grade-separated crossings or permanently blocked-off closures of existing at-grade crossings. (For a further discussion on the concern of at-grade crossings, see Section 3 below.)

4 cont.

3. Pedestrian and Bicycle Safety; Trespassing

The addition of this substantial increase in population near the UP Line creates concerns not only about traffic but also about pedestrian and bicycle safety. Planned uses near the UP Line include, without limitation, recreational facilities (*e.g.*, East Oakland Sports Complex, Municipal Boathouse), parks, pedestrian and bicycle trails (*e.g.*, Waterfront Trail along the Oakland Estuary between Jack London Square and 66th Avenue), marina uses, residential, open space, roadways, and retail/commercial. Although this area is already populated, these developments and improvements will likely attract a substantially large amount of people the immediate vicinity of the UP Line, thereby raising concerns about pedestrian and bicycle safety, and trespassing.

For instance, the Waterfront Trail will likely attract more pedestrians and cyclists to the area around the UP Line. UP generally disfavors the location of pedestrian trails and uses adjacent to its tracks and therefore any trails or pedestrian uses adjacent to or in close proximity of UP's tracks that are currently under consideration should be highly discouraged. The distance between the trail and the UP Line is anticipated to vary from one point to another. In some places, such as the vicinity of the mouth of the Channel, the trail would be located immediately adjacent to the UP line. Some of those people using the trail could walk across the UP Line to reach the trail at various points, and others might trespass onto the UP right-of-way itself. Similarly, the pedestrian, bicycle, and small boat improvements in connection with the Lake Merritt Channel Improvements likely will increase the number of people who may walk or bike across the UP Line, and/or walk, bike, or boat beneath railroad bridges that span the Lake Merritt Channel, at point close to the mouth of the Channel, and that parallel the automotive bridge on Fruitvale Avenue. These potential impacts raise concerns about pedestrian safety, trespassing and interference with rail operations.

5

The concern about safety is also exacerbated by the Project's proposal to increase the population near existing at-grade crossings, such as, among others, the intersection of Embarcadero and 5th Avenue, at 85th Avenue, and at 98th Avenue. Although the vehicular traffic analysis in the Draft EIR found the Project's traffic impacts on the intersection of Embarcadero and 5th Avenue to be less than significant, the Draft EIR contained no analysis regarding pedestrian and bicycle safety at that intersection, let alone the at-grade crossings at 85th Avenue and 98th Avenue, near the proposed expansion of the Center. Patrons of the Center may walk or jog through and around the surrounding neighborhood, meaning that some likely would walk across the UP Lines at the aforementioned at-grade crossings, or might trespass onto

6

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

the UP right-of-way itself. This increase in pedestrian activity near the UP Line could implicate pedestrian safety around the tracts. **6 cont.**

Another safety concern is the City's stated goal to provide trail access along the Lake Merritt Channel south of 7th Street, which would require the trail to cross the existing UP mainline rail tracks at-grade and/or require a new at-grade crossing along the channel. (DEIR, p. 129.) We note that, any such new at-grade crossings (or modifications to existing crossings) require the permission of the California Public Utilities Commission. Although the Draft EIR states that the "resolution of improving trail connectivity is not intended to be resolved in this study," UP advises in advance that it strongly objects to any proposed at-grade crossings because they have obvious safety implications and could negatively impact train operations. (*Id.*) **7**

The Restoration Along Sausal and Seminary Creeks (Group 4) also presents a possible safety concern. The creek restoration activities raise the issue of whether the public access improvements would attract any additional pedestrians or cyclists across or around the UP Line. If so, the Draft EIR should examine the possible safety impacts. **8**

The City should therefore closely analyze pedestrian and bicycle safety, and the likelihood of trespassing onto the UP right-of-way in order to set forth appropriate mitigation measures. As the Draft EIR recognizes, Policy W2.5 of the City's General Plan states: "[t]o create safe access to water pedestrian, bicycle, and automotive railroad crossings should be provided where feasible." Thus, appropriate mitigation measures are not only desirable in their own right, but are also crucial to the Project's consistency with the General Plan. Specifically, the City should consider requiring the developer to install grade-separated pedestrian and bicyclist crossings as well as require the developer to construct only grade-separated roadways across the UP Main Line. To this aim, UP appreciates the City's decision that the preferred plan for the continuation of the Bay Trail along the Oakland Estuary is for the trail to pass under the railroad bridges along Fruitvale and High Avenues. (Draft EIR, pp. 55, Appendix D at p. 3.) **9**

The City may also want to consider requiring the developer to eliminate the existing at-grade rail crossings by either constructing grade-separated crossings at those locations and/or eliminating the crossings altogether. Other possible mitigation measures that the City should consider include, but are not limited to, solid barriers along the full lengths of the right-of-way, (for example, walls, as opposed to fencing, to manage pedestrians and vehicles), relocating such land uses far away from the tracks where possible, setbacks and buffers, the installation of sound walls or other barrier fencing along the full lengths of the right-of-way, pedestrian gates, pavement markings, "no trespassing" signs, railroad safety education programs, and planning for safe transportation routes to schools, entertainment, shopping, and recreational facilities. **10**

4. Vibration

As the Draft EIR recognizes, the Project sites are located adjacent to or near the existing UP Line, which generates airborne vibration. (Draft EIR, p. 175.) It is well-known, however, **11**

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

that UP's rail operations, as well as passenger trains, also generate ground vibration associated with an active railway. For instance, the Waterfront Trail and pedestrian, bicycle and small boat improvements likely will attract more people to the area immediately surrounding the UP Line, thereby exposing them to typical vibration that come with freight and passenger rail service. The Project is therefore anticipated to expose increased population to existing vibration, and the City should analyze this possible impact.

11 cont.

Possible mitigation measures include a condition of approval that requires the developer to disclose to the general public this pre-existing and predictably-occurring vibration, as well as construction and design techniques (*e.g.*, trenching and/or floating floors) that absorb and/or minimize interior vibration.

5. Mechanical Odor

Finally, it is also well-known that locomotives not only generate noise and vibration, but also may emit mechanical odors. Other existing land uses in and around the site include industry and commerce, and such land uses typically generate odors associated with their specific uses, thereby potentially resulting in cumulative impacts that some people in the area may notice. The various development and improvements proposed for the Project will attract more people to the area surrounding the UP Line and therefore expose them to existing mechanical odor. Although the Draft EIR briefly discusses odors from restaurants, manufacturing plants, agricultural operations, and industrial facilities, it does not mention the mechanical odors associated with locomotives. (Draft EIR, p. 155.) The City should therefore consider analyze this potential impact in the Draft EIR and implement any necessary mitigation measures.

12

***

UP appreciates this opportunity to comment on the Draft EIR for the Project and hopes that the City, as lead agency, gives due consideration to the above concerns. On UP's behalf, we would welcome the opportunity to sit down together with City officials and staff to discuss this Project as it progresses or any other project that may relate to UP's property or operations within the area. Such a discussion would afford UP and the City the opportunity to work in collaboration to ensure that the Project and all future development near UP lines are compatible with the rail services that will continue to serve the area for years to come.

Please give notice to UP of all future developments with respect to this Project and any other proposed transportation improvements in the vicinity as follows:

13

Mr. Terrel Anderson
Manager of Industry and Public Projects
Union Pacific Railroad Company
10031 Foothills Boulevard
Roseville, California 95747-7101

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

With a copy to:

Andrew Bassak, Esq.
Shirley Jackson, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 30th Floor
San Francisco, California 94111.

13 cont.

Please do not hesitate to contact our office if you would like to schedule a meeting with UP or have any questions. UP will monitor this project with interest.

Sincerely,

Shirley E. Jackson

Shirley E. Jackson

cc: Andrew Bassak, Esq.
Mr. Terrel Anderson

19869:6608883.2

LETTER B25
Steefel, Levitt & Weiss
Shirley E. Jackson
September 14, 2007

Response B25-1: The comment letter was received on September 14, 2007, three days after the close of the comment period on September 11, 2007. Although the 45-day comment period for the Draft EIR had closed, the City has elected to respond to the comments provided in the letter.

Response B25-2: The comment, which describes elements of the proposed Measure DD Implementation Project and states that the project is likely to impact the Union Pacific Railroad (UPRR) lines and rail services, is noted. It requests that the EIR analyze traffic, safety, trespassing, vibration and mechanical odor issues associated with the proposed project's proximity to the rail line and require mitigation measures to reduce impacts. Refer to Response to Comment A7-1 and Responses to Comments B25-3 to B25-12 for responses to the specific issues raised for each topic.

Response B25-3: The comment, which describes certain aspects of the history of the Union Pacific Railroad (UPRR) and its presence in and around Oakland, is noted.

Response B25-4: The comment incorrectly states that the project would result in a substantial increase in population within close proximity of the UPRR Main Line. The project does not propose to build housing or other facilities that would substantially increase the residential population in the vicinity of the UPRR Main Line.

It is recognized that the East Oakland Sports Complex project would increase traffic volumes at the railroad crossings located at 98th Avenue and 85th Avenue. The study showed that peak hour traffic volumes on 98th Avenue would increase by less than two percent as a result of the project. The traffic added would not perceptibly affect traffic service levels at the rail crossing. The study did not evaluate traffic volume changes at 85th Avenue because the traffic volumes are relatively light and changes in traffic volume resulting from the Sports Complex were expected to have a less than significant impact on traffic operations along 85th Avenue.

The effectiveness of existing safety measures in place at all railroad crossings leading to the Sports Complex would not be significantly affected by the minimal changes in traffic volumes associated with the project. The small changes in traffic volumes would not justify construction of grade-separated crossings. Permanent blocked-off closures of existing at-grade crossings would transfer traffic volumes to other streets and could result in secondary traffic impacts.

Response B25-5: Please see Response to Comment B25-4 regarding population effects of the proposed project. In addition, project facilities, with the exception of portions of the Waterfront Trail and the trail along the Lake Merritt Channel, are located well away from (a quarter mile or more) the UPRR lines as shown in the figures provided in the Project Description and would not bring substantial numbers of people to the rail crossings.

It is recognized that there is a potential for pedestrians and bicyclists to travel between project elements (such as the Waterfront Trail and Lake Merritt) along 5th Avenue, Oak Street, or other streets near Embarcadero. The Draft EIR did not specifically address pedestrian impacts at railroad crossings because there are existing safety measures (i.e., crossing gates, warning lights, and chain link fencing along the Embarcadero) that would limit the ability of pedestrians and bicyclists traveling between the project elements to cross the tracks. The numbers of pedestrians or cyclists crossing the tracks to travel between project areas would not compromise the existing safety features at the crossings or exceed the capacity or capabilities of the existing controls to limit crossings of the rail lines.

The Waterfront Trail, which runs parallel to the UPRR lines, is separated from the tracks by roads, such as the Embarcadero and Interstate-880, and fencing. This infrastructure provides barriers between recreational users of the trail and the UPRR lines at non-street crossing locations. The trail along the Lake Merritt Channel currently ends just south of the 7th Street Bridge and this would not change as part of the project. No new at-grade crossings of the UPRR line are proposed as part of the project although existing crossings at 5th Avenue and Oak Street would be used by bicyclists and pedestrians, as they are now, to travel between the waterfront and other areas of Oakland. Refer to Response to Comment A7-1 for additional discussion of the rail line crossings.

The text on page 130 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (Pedestrian and Bicycle Transportation) (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing safety features would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

The text on page 139 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control

access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing facilities would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

Response B25-6: Please see Response to Comment B25-4 regarding population effects of the proposed project.

It is recognized that the project may increase pedestrian and bicycle activity along 5th Avenue, 85th Avenue and 98th Avenue; however, the increase is expected to be small and would be consistent with City of Oakland's policy to encourage pedestrian and bicycle travel along these routes. For the Draft EIR, a review was performed of the potential of the project to conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation and was found to be consistent with City policy. The Oakland Bicycle Master Plan proposes bike lanes along 5th Avenue and proposes designation of 85th Avenue and Edes Avenue as Class III bike routes. Similarly, the Oakland Pedestrian Plan identifies 5th Avenue and 85th Avenue as neighborhood pedestrian routes, 98th Avenue as a City pedestrian route, and Edes Avenue as a District pedestrian route.

The increase in pedestrian activity near the UPRR Line would not be of sufficient magnitude to significantly affect safety around the tracks and would not justify construction of grade separated crossings. Walking, jogging, or bicycling across the UPRR lines at the aforementioned at-grade crossings would be consistent with City policies, plans and programs. The potential for trespassing onto the UPRR right-of-way would not be substantially affected by the project.

Response B25-7: The comment, which states that the UPRR would strongly oppose an at-grade crossing of the UPRR tracks in the vicinity of the Lake Merritt Channel and that new crossings or modifications of existing crossing would require permission of the California Public Utilities Commission, is noted. Refer also to Response to Comment A7-1.

Response B25-8: The locations of proposed creek restoration, preservation and acquisitions sites are shown on Figure I-3 and described in Table III-2. None of the project locations along Sausal and Seminary creeks as cited in the comment are in close proximity to UPRR lines. The nearest activity associated with Sausal Creek is a daylighting of the creek at Hawthorne School, which is located about 0.5 miles from the railroad lines. The nearest activity on Seminary Creek site, which is also located about 0.5 miles from the railroad lines, is the removal of a concrete channel and site restoration. Both sites are located in residential areas and there is considerable urban infrastructure between the restoration sites and the railroad, making traffic, pedestrian or bicyclist connections between the locations unlikely. Neither of the proposed activities would attract vehicles, pedestrians or bicyclists to the UPRR lines.

A creek restoration site along Lion Creek on San Leandro Boulevard near 66th Avenue is in closer proximity to the UPRR tracks than the creek locations cited in the comment. The restoration activity at this site would create wetlands along an existing section of creek within a residential project and an existing park. The UPRR tracks lie to the west of the park. The restoration is not expected to substantially increase park use and most users of the park would come from the residential areas to the east rather than from the industrial area to west. Thus, the creek restoration would not generate a significant number of vehicle, pedestrian, or bicycle crossings of the UPRR tracks.

Response B25-9: The entire text of General Plan Policy W2.5 that is cited in the comment reads, "**Improved Railroad Crossings.** To create safe access to the water pedestrian, bicycle, and automobile railroad crossings should be provided where feasible. Crossings could include grade separations, at-grade crossings, skyway bridges, or connections between buildings." The policy analysis in Appendix D of the Draft EIR correctly states that the policy is not applicable to the Lake Merritt and Lake Merritt Channel, Recreational Facilities, and City-wide Creeks Groups as no rail crossings are proposed as part of these groups; the under-crossing of the rail line proposed as part of the Waterfront Trail is consistent with the policy as well. It should be noted that the policy includes at-grade crossings as an option for safe access to the waterfront, where feasible. The comment, which states that the UPRR appreciates the decision to route the Waterfront Trail to pass under the railroad bridge at Fruitvale and High [sic] Avenues, is noted. Refer to Responses to Comments A8-1, B22-2 and B22-3.

Response B25-10: The comment, which suggests design features as mitigation for reducing safety hazards at rail crossings, is noted. As impacts to safety were found to be less-than-significant no mitigation is required. Refer to Response to Comment, B25-4 to B25-6.

Response B25-11: The impacts of ground-borne vibration are analyzed on p. 181 of the Draft EIR, which concludes that there would be no impact during the project's operational phase. The proposed Measure DD Implementation Project would not expose a substantial number of people to ground-borne vibration associated with the UPRR operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors into proximity with the UPRR lines. No new crossings of the UPRR lines are proposed as part of the project. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. The text on page 181 of the Draft EIR is revised as follows:

(4) Vibration. None of the four project groups contain components that would generate ground-borne vibration levels that would be perceptible to the average person. ~~There would be no impact during the project's operational phase.~~ The project may briefly bring people into proximity with transportation facilities along the Waterfront Trail, such as railroad tracks, that produce ground-borne vibration. But the project would not frequently expose a substantial number of people to ground-borne vibration. Construction activities associated with implementation of the project,

including proposed pile driving activities, could temporarily expose persons in the vicinity of the proposed project construction areas to ground-borne vibration or ground-borne noise levels. However, the project would comply with the construction hours specified in the City's Noise Ordinance and the City's standard Conditions of Approval would be applied. Implementation of the Conditions of Approval would ensure potential ground-borne vibration would be avoided or reduced to a less-than-significant level.

Response B25-12: The proposed Measure DD Implementation Project would not expose a substantial number of people to odors associated with the UPRR railroad operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors in to proximity with the UPRR railroad lines. No new crossings of the UPRR lines are proposed as part of the project. The text on page 155 of the Draft EIR is revised as follows:

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

The text on page 159 of the Draft EIR is revised as follows:

(5) Objectionable Odors. The operation of the project components of Measure DD would not generate objectionable odors. Typically, major sources of odors include restaurants, manufacturing plants, and landfills. Other odor producers include industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects which are not expected to generate objectionable odors. The project may briefly bring people into proximity with industrial or transportation facilities that produce odors along the Waterfront Trail, but exposures would be brief and affect a relatively small number of people on an occasional basis. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. This potential impact would be less than significant.

Response B25-13: The comment, which states that the UPRR would welcome the opportunity to meet with the City to discuss its concerns, is noted.

C. VERBAL COMMENTS

The Planning Commission held a Public Hearing on September 5, 2007 to accept verbal comments on the Draft EIR from agencies, organization or interested individuals. The comments presented at the hearing are summarized and enumerated in attachment C1 and written responses follow.

Planning Commission Hearing
C1

COMMENTS AT THE OAKLAND CITY PLANNING COMMISSION PUBLIC HEARING FOR THE MEASURE DD IMPLEMENTATION PROJECT

September 5, 2007; City Council Chambers, City Hall, 1 Frank H. Ogawa Plaza

Public individuals spoke first, followed by Planning Commissioners.

Mike Bishop. Introduced himself as a representative of Hanson Aggregates at 4501 Tidewater Avenue in Oakland. Made the following comments:

- He has received little notice of scoping meetings for the project; he has been involved with the Bay Trail, working with City and Regional Parks. **1**
- Development of steel canopy noted in Table II-1 more complicated than described; site also has deteriorated dock that needs to be considered. **2**
- Narrowing of navigable channel under the bridges along the estuary makes it more difficult for barges to use the channel and might require switching to trucks to bring materials to Oakland. **3**
- Requested that the navigable channels be kept open. **4**

John Wilson. Made the following comments: **5**

- Many people who wanted to speak tonight had to leave earlier.
- Why are we 5 years into the Measure DD process and only now preparing an EIR? **6**
- The project has the appearance of poor planning and underfunding. There have been major design changes after the bond measure was passed. Why have projects changed? **7**
- Projects are stalled because they are overbudget.
- Government entities are only now being contacted. **8**
- Expressed concern about plan to remove trees; there is a mythology that only dead trees would be removed. **9**
- Found Figure III-1 helpful. Reason to remove trees was to create a view corridor. Asked where view corridor is and expressed concerned about tall buildings being constructed around lake **10**
- Lake is oldest designated wildlife sanctuary in nation. Boundary goes 1,065 feet from old tidal boundaries. **11**

Orna Sasson. Made the following comments:

- Voted on Measure DD to preserve parks.
- Old trees should be cared for by arborists.
- Parks are not the place for parking lots. **12**
- Need easements to preserve City parks.
- Let 1,000 parks bloom.

John Butcher. Introduced himself as the port captain for FOSS Maritime in Richmond. Made the following comments:

- Stated that he was here to discuss proposed walkway under bridges along the estuary. FOSS Maritime is a company of professional mariners that transports sand and other materials along waterways.
- The proposed walkways under bridges would reduce the openings by 25% under some conditions. Barges are 60-feet wide and the opening would be 90 feet when only one side of bridge is open. **13**
- Invited commissioners to see how channel would be constrained.

- A brief discussion occurred between Mr. Butcher, Commissioner Boxer, Joel Peter (Measure DD Program Manager), and Claudia Cappio (Community and Economic Development Agency, Development Director) ensued clarifying the proposed location and design of the walkway. Joel Peter indicated that the City believes that the walkway could be designed with adequate safety to protect users of the trail. **13 cont.**
- Mr. Butcher concluded by stating that he did not believe the walkway design is safe and that the Coast Guard agrees.

Nancy Rieser. Introduced herself as a member of Friends of the Lake. Made the following comments:

- Noted Friends of the Lake is sending written comments. **14**
- Stated that there is a lack of coordination with regional and state agencies with regards to the 12th Street Channel. **15**
- Stated the she has concerns about toxics in the bay fill in the project area that exceed state standards. **16**

David Mix. Made the following comments:

- Document is too extensive and not enough time at public hearing **17**
- Appendix C documents are too difficult to read, due to poor reproduction **18**
- He objects to entire document; it is based on improper or false material, junk science **19**
- Sewers and storm sewers have historically flowed into the lake and channel **20**
- Noted various studies that looked at flows through the channel. Some studies used MIKE II model and MIKE II didn't adequately consider elevations and size of culverts. **21**

Jonas LaMattery-Brownell. Introduced himself as a member of the Lake Merritt Neighbors Organized for Peace and a participant in the tree spirit photo by Jack Gescheidt. Made the following comments:

- Encourages the City to save as many trees as possible around Lake Merritt.
- The commentor read the following poem, which he had composed: **22**

The Merritt of Trees

Lake Merritt lakeshore's trees are alive,
As alive as you and me,
I run by them often and say,
Hey sticky sister, hey brother barkful,
Hello old one prickly, hello relatives rooted.
When I breathe, I breathe tree.
Just like sipping lake or sipping melted glacier stream,
Here in Oakland I breathe salty sunny air, a little pollution pepper and still too...
All the trees of Lake Merritt

Jacquee Castain. Made the following comments:

- Elmhurst District and East Oakland supports the East Oakland sports and swim center **23**
- Asked for City's help on cleaning up a nearby contaminated creek site on 85th Avenue. **24**

- Noted that according to the staff report and the EIR notice, comment period will end on September 10, which is a City holiday when offices will be closed. | 25
- The City of Oakland and the planning commission should allow more than 2 minutes per commentor to make verbal comments. The Planning Commission has reduced available meeting time over the past 4 years, which limits the number of people who can comment. | 26
- Measure DD funding was inadequate. | 27

Planning Commissioners

Michael Lichty. Made the following comments:

- Stated that many issues raised tonight didn't appear germane to the EIR and will be considered during engineering and design review. Claudia Cappio noted in response that impacts to navigable waterways are relevant to CEQA evaluation; document needs to identify impact to safety and navigation around bridge. | 28
- Need to resolve safety issue outside of the EIR process during the design work; hope issues will be taken seriously.

Paul Garrison. Made the following comments:

- Requested an update on the litigation about the proposed tree removals. Mark Wald provided an update. | 29

Suzie Lee. Made the following comments:

- Recommended commentors submit comments in writing;
- Expressed concern about impact to navigation and requested that impact be given serious consideration. | 30

Douglas Boxer/Michael Colbruno. Made the following comments:

- Commissioners stated that they would accept previous speaker's offer to take them out on a tug boat to observe the proposed sites of the trail walkways along the estuary. | 31

Madeleine Zayas-Mart. Made the following comments:

- Requested clarification of phasing and funding of project. Claudia Cappio noted that City is leveraging matching and supplemental funding from various sources. | 32

Oakland City Planning Commission Public Hearing Comments
September 5, 2007

Response C1-1: Refer to Responses to Comments B4-1 and B22-1 (comment letter B22 was submitted by the speaker).

Response C1-2: Refer to Response to Comment B22-3.

Response C1-3: Refer to Response to Comment B22-2.

Response C1-4: The comment, which requests that navigable channels be kept open, is noted. For additional discussion of this issue refer to responses to comment letters B8 (from the U.S. Coast Guard) and B22 (Mr. Bishop's written comments on the Draft EIR).

Response C1-5: The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-6: A history of the environmental review process for Measure DD-funded activities, which explains what has occurred between passage of Measure DD and the release of the Draft EIR, is provided in Chapter III, Project Description on pages 23 and 24 of the Draft EIR.

Response C1-7: The comment, which expresses concern about funding and planning for the Measure DD activities, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-8: Refer to Response to Comment B4-1.

Response C1-9: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30.

Response C1-10: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30. No tall buildings, which would block view corridors, are proposed as part of the project.

Response C1-11: The comment is noted. The Draft EIR notes the Lake's designation as a wildlife refuge on page 226.

Response C1-12: The comment does not address the environmental analysis of the Draft EIR so no further response is provided.

Response C1-13: The comment raises concerns about the impact of the Waterfront Trail on maritime shipping. Refer to responses to comment letters B8 and B22.

Response C1-14: The comments were submitted in writing. Refer to responses to comment letters B15 and B16.

Response C1-15: Refer to Response to Comment B4-1.

Response C1-16: Refer to Response to Comment B15-7.

Response C1-17: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-18: Full size copies of the original public comment letters that were received during the EIR scoping period have been and are available for review at: City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612.

Response C1-19: Mr. Mix submitted his comments in writing. Refer to response to his comment letter B11, in particular Responses to Comments B11-3 to B11-5, which are included under the heading "Junk Science" in the comment letter.

Response C1-20: The comment regarding the historic discharges to Lake Merritt is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response C1-21: Refer to Response to Comment B11-3.

Response C1-22: The comment, which addresses the merits of the project, is noted.

fallen trees, sadness
spring tides flow strong again
park and lake reborn

Response C1-23: The comment, which addresses the merits of the project, is noted.

Response C1-24: The comment, which identifies a creek segment not included in the Measure DD Implementation Project, is noted.

Response C1-25: Due to the City holiday, the City accepted comments on the Draft EIR until September 11, 2007.

Response C1-26: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-27: The comment, which states that Measure DD funding in inadequate, is noted.

Response C1-28: Refer to responses to comment letters B8 and B22.

Response C1-29: The requested information does not pertain to the environmental analysis of the Draft EIR. City legal counsel responded to the question at the public hearing.

Response C1-30: The statement regarding submittal of comments in writing is noted. Refer to responses to comment letters B8 and B22 for discussion of impacts to navigation and safety along the estuary.

Response C1-31: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response C1-32: Because of the large number of elements of the Measure DD Implementation Project, which are geographically dispersed across the City, a phasing plan for the entire project is not provided in the Draft EIR. Phasing and project status information for individual elements is provided where such information is available (see Table III-1 of the Project Description, for example). Individual projects would receive funding from a variety of federal, State and regional sources in addition to receiving Measure DD funds. The source of funding does not pertain to the environmental analysis of the Draft EIR.

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I. INTRODUCTION

A. PURPOSE OF THE RESPONSE TO COMMENTS DOCUMENT

This document has been prepared to respond to comments received on the Draft Environmental Impact Report (Draft EIR) prepared for the Measure DD Implementation Project (SCH# 2006122048). The Draft EIR identifies the likely environmental consequences associated with the implementation of the proposed project, and recommends mitigation measures to reduce potentially significant impacts. This Response to Comments (RTC) Document provides responses to comments on the Draft EIR and makes revisions to the Draft EIR, as necessary, in response to these comments or to amplify or clarify material in the Draft EIR.

This RTC Document, together with the Draft EIR, constitutes the Final EIR for the proposed project.

B. ENVIRONMENTAL REVIEW PROCESS

According to CEQA, lead agencies are required to consult with public agencies having jurisdiction over a proposed project and to provide the general public with an opportunity to comment on the Draft EIR.

The City of Oakland circulated a Notice of Preparation (NOP) that included a list of potential environmental effects that could result from the proposed project. The NOP was published on December 8, 2006 and a public scoping meeting was conducted on January 3, 2007. Comments received by the City on the NOP were taken into account during the preparation of the EIR.

The Draft EIR was made available for public review on July 20, 2007 and distributed to applicable local and State agencies. Copies of the Notice of Availability of the Draft EIR (NOA) were mailed to all individuals previously requesting to be notified of the Draft EIR, in addition to those agencies and individuals who received a copy of the NOP. Verbal comments on the Draft EIR were accepted at the City of Oakland Planning Commission meeting held on September 5, 2007.

The CEQA-mandated public comment period for the Draft EIR ended on September 11, 2007. The comment period extended over a 53-day period, about a week longer than the 45-day comment period required by the *California Environmental Quality Act (CEQA) Guidelines*, Section 15105(a). The Copies of all written comments received during the comment period are included in Chapter III of this document.

C. DOCUMENT ORGANIZATION

This RTC Document consists of the following chapters:

- *Chapter I: Introduction.* This chapter discusses the purpose and organization of this RTC Document and the Final EIR, and summarizes the environmental review process for the project.

- *Chapter II: List of Commenting Agencies, Organizations and Individuals.* This chapter contains a list of agencies, organizations, and persons who submitted written comments or spoke at the public comment session on the Draft EIR during the public review period.
- *Chapter III: Comments and Responses.* This chapter contains reproductions of all comment letters received on the Draft EIR as well as a summary of the comments provided at the public comment session. A written response for each CEQA-related comment received during the public review period is provided. Each response is keyed to the preceding comment. It should be noted that many of the comments received do not pertain to the CEQA analysis, but relate to the merits of the project or other issues. While these comments will be included in the record before the decision-makers, the purpose of this document is to respond to CEQA comments and not other issues.
- *Chapter IV: Draft EIR Revisions.* Corrections to the Draft EIR necessary in light of the comments received and responses provided, or necessary to amplify or clarify material in the Draft EIR, are contained in this chapter. Text with underline represents language that has been added to the Draft EIR; text with ~~strikeout~~ has been deleted from the Draft EIR. Revisions to figures are also provided, where appropriate.

II. LIST OF COMMENTING AGENCIES, ORGANIZATIONS AND INDIVIDUALS

This chapter presents a list of letters and comments received during the public review period and it describes the organization of the letters and comments that are included in Chapter III, Comments and Responses, of this document.

A. ORGANIZATION OF COMMENT LETTERS AND RESPONSES

Chapter III includes a reproduction of each letter received on the Draft EIR. The written comments are grouped by the affiliation of the commentor, as follows: State, local and regional agencies (A) and organizations and individuals (B). Verbal comments (C) provided at the Planning Commission meeting held on September 5, 2007 are provided in the order that they were given at the meeting.

The comment letters are numbered consecutively following the A and B designations. Verbal comments are numbered consecutively following the C designations. The letters are annotated in the margin according to the following code:

State, Local and Regional Agencies:	A1-#
Individuals & Organizations:	B1-#
Verbal Comments	C1-#

The letters are numbered and comments within that letter are numbered consecutively after the hyphen.

B. LIST OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS COMMENTING ON THE DRAFT EIR

The following comment letters were submitted to the City during the public review period and are arranged in order by the date received at the City.

State, Local and Regional Agencies

A1	AC Transit Nancy Skowbo, Deputy General Manager for Service Department	September 10, 2007
A2	Bay Conservation and Development Commission (BCDC) Sara Polgar, Planner	August 27, 2007
A3	Alameda County Flood Control and Water Conservation District County of Alameda Public Works Agency Kwablah Attiogbe, Environmental Services Supervisor	September 10, 2007
A4	East Bay Municipal Utility District (EBMUD)	September 10, 2007

	William Kirkpatrick, Manager of Water Distribution Planning	
A5	East Bay Regional Park District Chris Barton, Senior Planner	September 5, 2007
A6	California Department of Transportation (Caltrans) Timothy Sable, District Branch Chief	September 10, 2007
A7	California Public Utilities Commission (PUC) Kevin Boles, Environmental Specialist	August 31, 2007
A8	United States Coast Guard David H. Sulouff, Chief, Bridge Section	September 7, 2007

Organizations and Individuals

B1	Golden Gate Audubon Society John Bowers, Member, East Bay Conservation Committee	September 7, 2007
B2	California Oaks Foundation Janet Santos Cobb, President	September 10, 2007
B3	Law Offices of Brian Gaffney Matt McFarland	September 7, 2007
B4	Bishop Architecture Ron Bishop, Architect - AIA	September 11, 2007
B5	Ron Bishop	September 5, 2007
B6	Friederike E. Droegemueller	September 19, 2007
B7	John MacHenry	September 11, 2007
B8	Joe Matera Acting President, Essex Homeowners Association	September 11, 2007
B9	David Gill Past President, Lakeside Regency Plaza Homeowners Association	September 11, 2007
B10	David Mix	September 5, 2007
B11	David Mix	September 13, 2007
B12	David Mix	September 11, 2007
B13	Gloria Pieretti	September 10, 2007
B14	Ken Pratt	September 11, 2007
B15	Nancy Rieser	August 5, 2007
B16	Nancy Rieser	September 10, 2007
B17	John Wilson	September 11, 2007
B18	Elise Ackerman	September 11, 2007
B19	Barton Mayhew	September 11, 2007
B20	Catherine McBride	September 11, 2007
B21	Inlandboatmen's Union of the Pacific Marina Secchitano, Vice President	September 5, 2007

B22	Hanson Aggregates Mike Bishop, Marine Operations Manager	September 10, 2007
B23	Gallagher & Burk Materials Division Alan French, General Manager	August 22, 2007
B24	Union Pacific Railroad Company Jeff Asay, Senior Counsel – Western Region	September 10, 2007
B25	Steefel, Levitt & Weiss Shirley E. Jackson	September 14, 2007
C1	Planning Commission Public Hearing Comments	September 5, 2007

III. COMMENTS AND RESPONSES

Written responses to each comment letter received on the Draft EIR are provided in this chapter. Letters received during the public review period on the Draft EIR are provided in their entirety. Each letter is immediately followed by responses keyed to the specific comments. The letters are grouped by the affiliation of the commenting entity as follows: State, local and regional agencies and commissions (A); organizations and individuals (B); and public hearing comments (C).

The reader should note that where text within individual letters is not enumerated, it does not raise environmental issues and does not relate to the information or analysis within the Draft EIR; therefore, no response is required.

MASTER RESPONSE M-1 – PROJECT-RELATED TREE REMOVALS

The City has received comments on the Draft EIR's analysis of the tree removals associated with the implementation of Measure DD-funded activities and has prepared Master Response M-1 to address this issue. Master Response M-1 also provides updated information about events related to three tree removal permits that occurred after the Draft EIR was published. The Master Response includes revisions to the Draft EIR made to disclose these events and to respond to specific comments made on the Draft EIR.

Summary of Events Related to Permits to Remove Trees around Lake Merritt

In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures required by previously prepared CEQA documents. As a result, because none of the circumstances calling for preparation of a subsequent or supplemental EIR were present the City prepared an Addendum to the previous environmental documents.

In December 2005, the City issued three permits for the removal of trees around Lake Merritt. The tree removals are part of the implementation process for the reconstruction of 12th Street and park and street improvements along Lakeshore Avenue, Lakeside Drive and at the Municipal Boathouse. In accordance with CEQA, prior to approving these permits, the City prepared an environmental analysis of the proposed removals, which showed that none of the circumstances calling for preparation of a subsequent or supplemental EIR were present. In August 2006, a lawsuit was filed that challenged the City's granting of the permits. The lawsuit made several arguments against the approval of the permits including that the tree removals would have an aesthetic impact and impacts on biological resources. Further, the lawsuit claimed that the City's environmental review of the permits was inadequate and that additional CEQA documentation should be prepared to address the proposed tree removals. At the time that the Draft EIR for the Measure DD Implementation Project was published in July 2007, the lawsuit was still pending. On October 10, 2007, the Superior Court of California, County of Alameda, upheld the permits, finding that "substantial evidence does not exist in the record to support a fair argument that the issuance of the tree permits may have a significant effect on the environment requiring an EIR be prepared." Thereafter, the City removed some trees around Lake Merritt, including those along Lakeshore Avenue and Lakeside Drive near the Municipal Boathouse pursuant to the permits.

The City issued the Notice of Preparation (NOP) for the Measure DD Implementation Project EIR on December 8, 2006. As some project components had already been planned, designed and funded in reliance upon the 2002 Addendum and prior to the City's decision to prepare this EIR, some components of Measure DD were already constructed or were under construction. These components are described and analyzed in the EIR at a level appropriate to their stage of development when the NOP for the project was issued in December 2006. Included in the Draft EIR is an analysis of the impacts of the project-related tree removals around Lake Merritt and elsewhere. This analysis was included in the EIR because the tree removals had not occurred at the time the NOP was published

and thus the trees were part of the environmental setting against which the impacts of the project were assessed.

Consistent with the City's previous analysis, the Measure DD Implementation Project EIR finds that the tree removals will not have any significant unmitigated environmental effects. Although the removal of some trees has already occurred in accordance with the City's tree removal permit process, the removal does not alter the analysis or findings of this EIR. Subsequent removals associated with the previously issued permits will be performed in accordance with the information and analysis presented in the Measure DD Implementation Project EIR and previous environmental documentation, as have the removals that have already occurred.

In recognition of the Court's ruling upholding the City's CEQA determination on the tree permits and affirming their validity and to reflect the fact that some trees have been removed and others will be removed in accordance with the previously issued permits, and that new trees will be planted in accordance with the previously issued tree permits, the text of the Draft EIR is revised as indicated below. Where appropriate, the revised text includes revisions made in response to specific comments that are addressed elsewhere in the Response to Comments document. Revisions have been made to the Project Description (Chapter III), Biological Resources (Section IV.F), Aesthetic Resources (Section IV.M); and Alternatives (Chapter V).

Project Description (Chapter III)

The text that begins on Page 23 of the Draft EIR is revised as follows:

MEASURE DD BACKGROUND

In November 2002, Oakland voters passed a $198,250,000 bond measure entitled *Oakland Trust for Clean Water, Safe Parks* (Measure DD). This bond measure authorizes funding for physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration activities.

In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures required by ~~in~~ previously prepared CEQA documents. As a result, because none of the circumstances calling for preparation of a subsequent or supplemental EIR were present, ~~and thus~~ the City prepared an Addendum to the previous environmental documents.

As more defined proposed project components have been identified since the 2002 Addendum, the City has now decided to prepare this EIR to provide a more comprehensive environmental analysis for the Measure DD Implementation Project. As some project components had already been planned, designed and funded in reliance upon the 2002 Addendum and prior to the City's decision to prepare this EIR, some components of Measure DD have already been constructed or are currently under

construction. These components are described and analyzed at a level appropriate to their stage of development when the NOP for the project was issued in December 2006.

~~As of this writing, there is a pending lawsuit that challenges the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. The City has not implemented these approvals during the pendecy of the lawsuit.~~ At the time the Draft EIR was published in July 2007, a lawsuit was pending that challenged the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. On October 10, 2007 subsequent to the close of the public review period for the Draft EIR, the Superior Court of California, County of Alameda, upheld the tree permits and the City's CEQA determination for the tree permits ruling that "substantial evidence does not exist in the record to support a fair argument that the issuance of the tree permits may have a significant effect on the environment requiring an EIR be prepared." The court also dismissed the challenge to the Channel Wetlands and Widening Project EIR and entered judgment in favor of the City. Thereafter, the City removed some trees around Lake Merritt, including those along Lakeshore Avenue and Lakeside Drive near the Municipal Boathouse pursuant to the permits. None of these removals (nor any other circumstances occurring subsequent to circulation of the Draft EIR) alter the EIR's analysis or conclusions. The EIR acknowledges that the tree removals will occur and new trees will be planted in accordance with the previously issued permits.

The text at the bottom of page 30 of the Draft EIR is revised as follows:

The City is proposing to renovate existing plantings and irrigation around the 12th Street component site. This includes removing approximately 157 existing trees from the median strip along 12th Street, the Kaiser Convention Center parking lot and some areas along the banks of the Lake Merritt Channel and replanting these areas with approximately 321 new trees and other landscaping. The final numbers of trees removed or planted may differ slightly from these counts. Some trees will ~~would~~ be removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy. Figure III-3 shows the area where trees are ~~proposed~~ to be removed as part of this project component. As part of the project design process the City hired a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ around Lake Merritt and the Lake Merritt Channel. The arborist recommended preserving four trees in this area by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project. The arborist's report is provided in Appendix I.

The fourth sentence in the last paragraph at the bottom of page 35 of the Draft EIR is revised as follows:

The City will ~~is proposing to~~ remove some existing trees (approximately 58) along the channel as shown in Figure III-5.

The text at the top of page 41 of the Draft EIR is revised as follows:

(2) Lakeshore Avenue Variant B. Lakeshore Avenue Variant B proposes to re-stripe the street to create one travel lane in each direction, a Class 2 bike lane in each direction, a continuous

left-turn lane down Lakeshore Avenue, and parking lanes along both curbs. A planting strip, including street trees, would be included along the park border. A multi-use path would be installed between the planting strip and the park landscaped area. As with Variant A, park landscaping would be renovated ~~and the removal of~~ with some trees removed~~is proposed~~. The surface of the lakeside path would be resurfaced with stabilized decomposed granite and would be widened at the narrow spots. The pedestrian crossing at Cleveland Cascade would be improved and mid-street pedestrian islands would be included at intersections as appropriate. Typical construction activities would include paving, grading, path resurfacing and replanting of landscaping.

The text at the bottom of page 41 of the Draft EIR is revised as follows:

(7) Landscaping Improvements. Approximately 9 acres of existing planting and irrigation are proposed to be renovated along Lakeshore Avenue. This renovation ~~would~~ includes removing approximately 24 existing trees and planting approximately 135 new trees. The final numbers of trees removed or planted may differ slightly from these counts. As part of the project design process the City hired a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ around Lakeshore Avenue. The arborist recommended preserving one tree in this area by relocating it. The City has incorporated this recommendation into the project. The arborist's report is provided in Appendix I. The trees were identified for removal ~~would be removed~~ because they are diseased, have severe structural defects, are crowding buildings, conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy. Landscaped areas with shrubs and ground cover would replace the existing lawn in narrower parts of the park corridor. This substitution would reduce maintenance and water use and reduce the attractiveness of the area to Canada geese. Hardscape development, including benches and patios, would be added at creek nodes and areas where small peninsulas jut out into the Lake. Figure III-7 shows a proposed landscaping plan, which indicates where trees would be removed and new trees would be planted.

The text at the top of page 47 of the Draft EIR is revised as follows:

Approximately 4 acres of existing planting and irrigation are proposed to be renovated along Lakeside Drive and around the Boathouse. This renovation ~~would~~ includes removing approximately 20 existing trees and planting approximately 65 new trees. The final numbers of trees removed or planted may differ slightly from these counts. The trees were identified for removal ~~would be removed~~ because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees that have reached the end of their life expectancy. Figure III-9 shows the proposed landscape plan, which indicates the locations of ~~where~~ tree removals ~~would be removed~~ and new tree plantings ~~would be planted~~.

Biological Resources (Section IV.F)

The text that begins at the bottom of page 211 of the Draft EIR is revised as follows:

(1) Candidate, Sensitive, or Special-status Species. The only special-status species potentially occurring within all component groups is Cooper's hawk, a California Species of Special Concern. The numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk. In addition, some of the creek restoration sites in the upper Oakland watershed may contain suitable nest trees for

sharp-shinned hawk. Both these species are California Species of Special Concern. ~~Proposed t~~Tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-shinned hawks by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure and/or nest abandonment.

Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-shinned hawks to a less-than-significant level. The pre-construction survey shall be conducted within 15 days prior to the start of work from March 15 though May (since there is higher potential for birds to initiate nesting during this period), and within 30 days prior to the start of work from June through August 15.

The discussion of protected trees in the middle of page 213 of the Draft EIR is revised as follows:

(6) Protected Trees. Based on current plans, the Lake Merritt and Lake Merritt Channel group includes removal of ~~proposes to remove~~ a number of ~~protected~~ trees protected under the City's Tree Ordinance. Protected trees might also be removed as part of the Waterfront Trail, Recreational Facilities, and City-wide Creeks groups. This impact is discussed in Section IV.F2c.

The discussion of protected trees beginning on page 218 of the Draft EIR is revised as follows:

(6) Protected Trees. In order to create additional parkland along the south shore of Lake Merritt and make other improvements around the Lake, approximately 259 trees, including 129 protected trees, are to ~~would~~ be removed and 521 new trees and other landscaping are to ~~would~~ be installed to replace them. Approximately 510 existing trees will ~~would~~ be retained. Overall, the trees will ~~would~~ be replaced at about a 2:1 ratio, that is, two trees will ~~would~~ be planted for each tree removed. Table IV.F-3 summarizes the ~~proposed~~ tree removals and new plantings by project component within the Lake Merritt and Lake Merritt Channel project group. As part of the project design process the City engaged a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ in this group. The arborist recommended preserving five trees by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project and the numbers in Table IV.F-3 reflect the preservation of these trees. The arborist's report is provided in Appendix I.

Table IV.F-3: ~~Proposed~~ Tree Removals for the Lake Merritt and Lake Merritt Channel Project Group

Project Component	Trees to be Retained[a]	Trees to be Removed ~~Proposed for Removal~~	Protected Trees to be Removed ~~Proposed for Removal~~	New Trees to be Planted	Ratio of Trees Planted to Trees Removed
Lakeside Drive/Municipal Boathouse	30	20	17	65	3.25
Lakeshore Avenue/El Embarcadero	90	24	6	135	5.4
12th Street Reconstruction	50	157	90	321	2.0
Lake Merritt Channel	340	58	16	0[b]	0
TOTAL	**510**	**259**	**129[c]**	**521**	**2.0**

[a] Numbers of trees are approximate. Totals include trees recommended for preservation or relocation by the certified arborist.

[b] No new trees will ~~would~~ be planted along the Channel because the habitat type would be converted from landscaped urban parkland to wetlands and open water.
[c] Includes eight protected oak trees.
Source: HortScience, 2007.

The City of Oakland's Tree Preservation and Removal Ordinance (OMC Chapter 12.36) requires a permit for removal of protected trees. A permit is also required if work might damage or destroy protected trees. The project will ~~would~~ comply with the Tree Preservation and Removal Ordinance and ~~would~~ obtain permits for the removal of any protected trees. In addition, the City considers other factors in determining significance for purposes of CEQA including: the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, with special consideration given to native trees, as discussed below.

The majority of protected trees to be removed are located in the 12th Street reconstruction area. Although protected trees are present in this area many of the trees are in poor or fair condition (see Appendix I); are in the landscaped median strip for 12th Street that is accessible only via rarely used pedestrian underpasses; or are in small planting strips within the parking lot for the Kaiser Convention Center (see Figure III-3). Most of the trees are non-native ornamental species. When the project components around Lake Merritt are looked at as a whole, about twice as many trees are retained in the project area as are to ~~would~~ be removed and approximately two trees will ~~would~~ be planted for each tree removed. The new trees in the 12th Street reconstruction area will ~~would~~ be part of proposed landscaped areas that would have direct pedestrian access to Lake Merritt and surrounding civic buildings. The four components of Group 1 (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and Lake Merritt Channel) either retain more trees than they ~~would~~ remove and/or plant at least twice as many new trees as are ~~would be~~ removed (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and 12th Street Reconstruction). Eight trees to be removed are protected native oak trees.

The project would not fundamentally conflict with the City of Oakland's Tree Preservation and Removal Ordinance and would therefore be a less-than-significant impact for the following reasons: approximately twice as many trees will ~~would~~ be retained as will ~~would~~ be removed; removed trees will ~~would~~ be replaced at approximately a 2:1 ratio; the majority of trees to be removed are in poor or fair condition; and many are located in a parking lot or an inaccessible median strip. In addition, because trees are being replaced at approximately a 2:1 ratio many benefits lost by the removal of trees, such as aesthetics, energy conservation, reductions in stormwater runoff, improvements in air quality, and capture of carbon dioxide (a greenhouse gas) will ~~would~~ be compensated for in a few years because of the large number of new trees being planted. The impacts of removing trees and the benefits of planting new trees in the Lake Merritt and Lake Merritt Channel group were estimated quantitatively using a computer application developed by scientists at the United States Department of Agriculture (USDA) Forest Service's Pacific Southwest Research Station to assess populations of street trees.[1] The results of this study are provided in Appendix I. Because the City would comply with the Tree Preservation and Removal Ordinance, the Lake Merritt and Lake Merritt Channel project components would have a less-than-significant impact. To reach this conclusion, the City considered the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, including native trees.

[1] USDA Forest Service. http://www.itreetools.org/street_trees/introduction_step1.shtm.

A small number of protected trees may require removal as part of the Waterfront Trail, Recreational Facilities, City-wide Creeks groups or other components of the Lake Merritt group (e.g., the Cleveland Cascade). The trees would be replaced in accordance with the City's Tree Protection Ordinance and Standard Conditions of Approval (Condition 32), which would reduce the impact to a less-than-significant level.

Aesthetic Resources (Section IV.M)

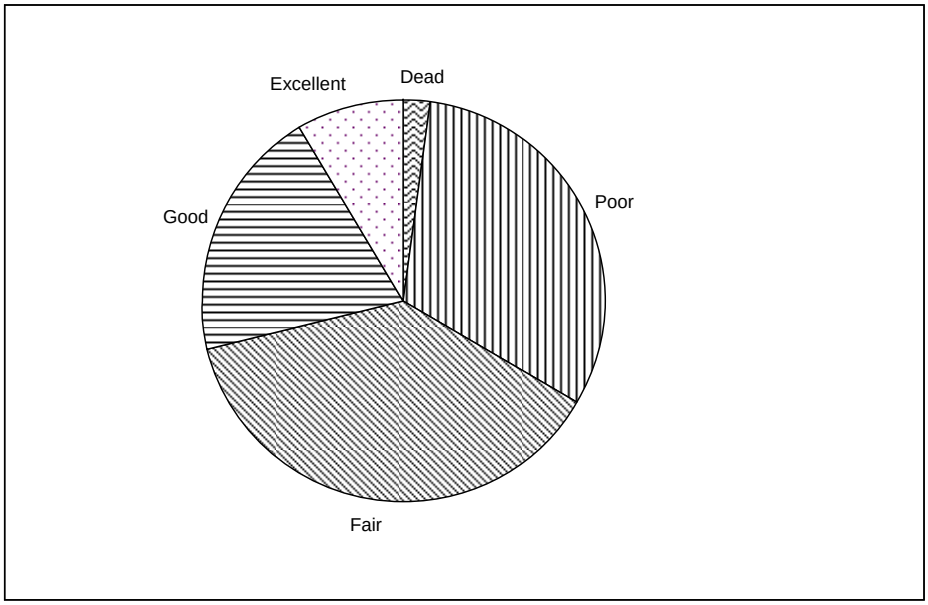
Page 336 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and the Lake Merritt Channel are resources that are part of scenic vistas seen from numerous locations in Oakland, including the City's Downtown and hillside areas. The proposed project would result in beneficial impacts to the visual quality of the Lake through water quality control measures, the restoration of historic buildings and monuments around the perimeter of the Lake, and enhanced landscaping. These changes to the Lake and the Channel would result in small but beneficial improvements to scenic vistas encompassing these waterways. ~~The project would result in the r~~Removal of certain ~~diseased~~ trees from the vicinity of the Lake is consistent with and in furtherance of the project.~~;~~ The removal of these trees will enhance the visual character of the Lake and ~~; however, the removal of these trees~~ will ~~would~~ not substantially adversely change scenic vistas. New trees will ~~would~~ be planted to replace the trees that are removed, and these trees will not substantially block scenic vistas. No structures would be built that would block surroundings and would not block scenic views of the Estuary. Therefore, this group of project components would have a less-than-significant impact on scenic vistas.

Page 341 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). A key component of this group is the various proposed water quality control measures, including the installation of devices and features to clean and circulate water, and the creation of an open channel to allow for increased tidal flow into and out of the Lake. These measures, by improving water quality in the Lake, would enhance the scenic qualities of the waterway (including portions of the Lake visible from I-580), which suffers from algal blooms and stagnation associated with a surplus of nutrient-rich pollution. In addition, this group would involve the renovation of existing landscaping, which would improve the landscape context of the Lake. ~~As part of the project, certain trees would be removed (and replaced with healthy individuals).~~ Based on the Tree Assessment prepared by HortScience, Inc. (Appendix I), of the 269 trees that will be removed as part of the project, 6 are dead, 84 are in poor condition, 101 are in fair condition, 55 trees are in good condition, and 23 trees are in excellent condition (see Chart IV.M-1). As shown in Chart IV.M-1, ~~M~~many of the trees considered for removal ~~that would be removed~~ are diseased, short-lived, or are not stable (i.e., they are dead, or in poor to fair condition). Although some of the trees subject to removal may ~~that would be removed~~ contribute or may have contributed to the scenic quality or overall visual character of the Lake, this contribution is not significant either individually or cumulatively. In context, approximately 500 trees will be retained in the project area and 521 trees will be planted as part of the project (a replacement ratio of almost two trees for every removed tree). These replacement trees will fill in any visual "gaps" created by the removed trees. As shown in Figures IV.M-1 through IV.M-4, the removal of trees from the site will not adversely affect scenic resources or visual character as seen from key viewpoints around Lake Merritt.

Chart IV.M-1: Tree Condition and Frequency of Occurrence



Source: HortScience, Inc., 2007.

This conclusion is also supported by a cost/benefits analysis of tree removal/replacement conducted by HortScience as part of the Tree Assessment. Using a model that takes into account the environmental and economic benefits of trees (including improvement of visual quality, reductions in storm water runoff, improvements in air quality, and sequestration of carbon dioxide), HortScience determined that the trees subject to removal from the site provide an estimated $29,438 in annual benefits, approximately 77 percent of which ($22,866) is associated with aesthetic value. At planting, the 521 replacement trees will provide an estimated $22,986 in annual benefits, "almost entirely due to aesthetic and other benefits." As the trees mature, the value of their annual benefits will increase to $33,193 at 5 years and $40,700 at 20 years. Therefore, based on the model, within only 5 years of planting, the replacement trees will be more valuable in terms of aesthetics and other environmental/ economic benefits than the existing trees that will be removed as part of the project. Although there are limitations with assigning monetary values to resources like trees (i.e., resource valuation generally lacks a reliable way to estimate the value of ecological damage), the data produced by HortScience suggest that the aesthetic costs of tree removal do not outweigh the benefits of tree replacement. Based on the HortScience analysis, and an understanding of tree removal in the context of trees that will be preserved and trees that will be replaced as part of the project, ~~Therefore,~~ the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources or the visual character of the project site.

Page 342 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and its surroundings are characterized by a semi-formal landscape of rolling lawns and walkways, all oriented around the water body itself. While the area has high visual quality, the aesthetics of the area are diminished

primarily by low water quality in the Lake, landscaping and trees that are in poor condition, and roadways surrounding the Lake that are disproportionately wide and emphasize automobile traffic at the expense of the pedestrian environment. The proposed project would substantially improve these adverse conditions. First, the removal of the 12th Street culvert and the implementation of the various water quality control measures would improve the water quality of the Lake, and enhance the potential for the growth of native vegetation and use of the water body by native wildlife (besides Canada geese). Second, landscaping and trees in poor condition will ~~would~~ be removed and replaced with new plants that would enhance the visual environment. Third, several roadways (including 12th Street, Lakeshore Avenue, and Lakeside Drive) would be reconfigured and/or narrowed to include bike lanes and pedestrian paths. These changes would reduce the visual intrusion of motor vehicles and would improve the visual environment for the bikers and walkers that comprise the key users of Lake Merritt. Lastly, historic buildings around the Lake, some of which are in poor condition, would be rehabilitated. At the Municipal Boathouse, two parking lots next to the Lake and Boathouse would be removed and replaced with landscaping, terraces, and pathways. A smaller parking lot would be constructed closer to the road and the remaining parking would be relocated along Lakeside Drive itself. The improvement and preservation of historic structures, and the modification of parking areas would benefit the visual quality of the area, including the lakeshore itself. Therefore, the project group would have a less-than-significant impact on the existing visual character of the area surrounding the Lake and Lake Merritt Channel.

Alternatives (Chapter V)

The third paragraph of Section V.D on page 352 of the Draft EIR, is revised as follows:

For Group 1, the No Project alternative would include completion of the Pergola, Children's Fairyland, the E. 18th Street Pier, and Municipal Boathouse renovations. However, paths, landscape improvements and additional patron parking (for the Boathouse) that would provide improved access to the facilities would generally not be constructed. The land around Lake Merritt would continue to be used as park land. Landscape maintenance, including the removal and replacement old or diseased trees, would continue as needed. Trees will be removed along Lakeshore Avenue, Lakeside Drive and the 12th Street reconstruction area in accordance with the permits for the removal of trees previously issued by the City. ~~The tree replacement process would generally maintain the current appearance of the park, but no substantial increase in landscaped area or number of trees is likely to occur because there would be no net increase in parkland as would occur if the project were constructed as proposed.~~ The creation of bike lanes by restriping Lakeside Drive and Lakeshore Avenue might occur as part of other projects, but associated landscaping and pedestrian path improvements would not be constructed.

Table V-1 on page 353 of the Draft EIR, is revised as follows:

Table V-1: No Project Alternative (Groups 1 and 2): Components Completed or In Progress and Components Unbuilt

Lake Merritt and Lake Merritt Channel (Group 1)
Components Completed or In-Progress • Pergola Renovation (complete) • Installation of a Fire Protection Main (complete) • Water Quality Improvements, including storm drain filters at Bellevue/Staten, 27th/Valdez, and 22nd/Valley; pilot air diffuser project; new aeration fountain; Pergola fountain (complete) • Children's Fairyland Renovations (in-progress) • Municipal Boathouse Renovation (in-progress) • E. 18th Street Pier Improvements (in-progress) • Tree removals along Lakeshore Avenue and Lakeside Drive **Unbuilt Components** • 12th Street Improvements • Lake Merritt Channel • Lakeshore Avenue~~,~~ and El Embarcadero~~, and E. 18th Street Pier Improvements~~ • Lakeside Drive • Snow Park and Lakeside-Harrison-20th Street Intersection • Bellevue Avenue Redesign • Sailboat House • All water quality improvements except those noted above
Oakland Waterfront Trail (Group 2)
Components Completed or In-Progress • Union Point Park • Park Street Triangle traffic study • Alameda Avenue south of Fruitvale Avenue • 66th Avenue Gateway **Unbuilt Components** • Estuary Park • 10th Avenue Marina • Brooklyn Basin • Brooklyn Basin to Embarcadero Cove • Livingston Pier • Cryer Site • ConAgra to Park Street Bridge • Bridge boardwalks at Park Street, Fruitvale Avenue and High Street • Derby Avenue to Lancaster Street (Oakland Museum Women's Board warehouse) • ~~Alameda Avenue south of Fruitvale Avenue~~ • US Audio/Capture Technologies and friendly Transportation Trail Connection • Gallagher & Burk/Hanson Aggregate Trail Connection • ~~66th Avenue Gateway~~

The third paragraph of Section V.E.2 on page 356 of the Draft EIR, is revised as follows:

Although the City has a permit for tree removals in the 12th Street reconstruction area, as of this writing, none has been removed. The alternative would reduce the number of trees that will need to ~~would~~ be removed to allow the reconstruction and realignment of 12th Street. In this scenario, the Kaiser Convention Center parking lot would not be reconfigured and therefore the trees located in this area would be preserved. Approximately 59 trees would be preserved, including 12 protected trees (all flowering cherries), in and around the parking area. Trees along the median of the existing 12th

Street alignment would still be removed ~~require removal~~ in order to accommodate the new roadway and modified grade of the park land.

A. STATE, LOCAL AND REGIONAL AGENCIES AND COMMISSIONS

Letter
A1

1600 Franklin Street, Oakland, CA 94612 - Ph. 510/891-4716 - Fax. 510/891-715

Nancy Skowbo
Deputy General Manager - Service Development

September 10, 2007

City of Oakland
Public Works Department, Transportation Services Agency
250 Frank Ogawa Plaza, Suite 3315
Oakland, Ca. 94612

Subject: Draft Environmental Impact Report (EIR) for the Measure DD Implementation Project

To Whom It May Concern:

Thank you for the opportunity to comment on the Draft EIR on the Measure DD Implementation Project. We applaud the City's efforts to use this voter-approved funding source to rebuild and renew Lake Merritt and Oakland's park and recreation infrastructure. AC Transit supports the development of multi-use paths around Lake Merritt. AC Transit also supports improvements to the pedestrian realm, within which our passengers walk to and wait for buses. **1**

However, we are seriously concerned about some projected impacts of Measure DD projects. In particular, we are concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam. 12th Street Dam is one of the most critical links in the entire AC Transit system. It would be deeply unfortunate if the environmental benefits of Measure DD projects were undermined by environmental losses from transit.

11th and 12th Street from Martin Luther King Junior Way to 1st Avenue are specifically noted as streets of particular interest to AC Transit in the Transit Streets Cooperative Agreement recently signed by the City and AC Transit. The affected section of Harrison Street is served by line NL, one of the frequent service lines that the **2**

Agreement prioritizes. The Transit Streets Agreement lays out notification and consultation procedures for the City and AC Transit to use on projects affecting major transit corridors. The Agreement embodies and anticipates a spirit of collaboration and cooperation between the City and AC Transit. The 12th Street corridor is also discussed in the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the East Bay Bus Rapid Transit Project.

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AC Transit has had ongoing and constructive discussions with the Public Works Department about impacts of and mitigations for the 12th Street roadway reconstruction project. We believe that the plans developed for the long construction period of the project have substantially responded to AC Transit concerns. **2 cont.**

The Measure DD Project and AC Transit's Concerns

Measure DD is a $198 million bond passed by the voters of Oakland in 2002. Measure DD provided funds for park, recreation and open space projects throughout Oakland, with an emphasis on the Lake Merritt and Oakland waterfront areas. It also provides funds to develop a park in the former 9th Avenue Terminal area, the area where the Oak to 9th Project has been approved (pending legal actions). **3**

The project that is most significant to AC Transit involves the substantial narrowing of the roadway across Lake Merritt on the 12th St. Dam. A roadway that now provides six lanes in each direction would be reduced to three lanes in each direction. The existing roadway would be eliminated and a new roadway constructed somewhat farther from the Lake. We understand the City's desire to reduce the large amount of roadway in that area, but this must be balanced with the need to maintain viable transit operations. **4**

We are also concerned about projects that would take place in the area of 20th & Harrison Street which would cause delays to bus service in that important service area. **5**

12th Street Dam Roadway

Projected Travel Time Impact of Measure DD Project on 12th St.

In our letter concerning the Notice of Preparation (NOP) for this EIR, AC Transit stated "The EIR should analyze the likely impact of roadway changes on bus speeds during both the construction period and with the final configuration." The EIR includes information about existing travel time and projected change in vehicle travel time across the 12th St. dam in Tables IV.C-4, Tables IV.C-6, and Table IV.C-8. We appreciate the City of Oakland's responsiveness to our request. We have summarized the data in the table on Page 6 of this letter. **6**

However, the stated increases in travel time may underestimate the actual delay for buses. To the extent that buses need to pull into and out of traffic flow for stops, their travel time could be greater. However, the projected increases in travel time are for travel from Madison St. to Foothill Boulevard. Since some buses would leave this route at International Boulevard, increases in travel time could be smaller.

The travel time projections are presented as summary estimates for a roadway segment. It would be helpful if the methodology to develop these projections was discussed further and if the projections were also presented in more disaggregated form. It would also be helpful if midday delay estimates were provided. That would **7**

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allow us to more precisely estimate the potential impact of traffic delays on AC Transit operations and costs. **7 cont.**

Transit Service across 12th St. Dam—Current and Planned

The importance of the 12th Street roadway to the AC Transit system is hard to overstate. The 12th St. Dam has the second highest volume of AC Transit buses of any roadway in Oakland (after Broadway downtown). Six bus lines use this route; they are the1 International, the 1R International Rapid, 13 Lakeshore, 14 San Antonio, 18 Park, and 40 Foothill. The 1, 1R, 18 and 40 are among the busiest and most important routes in the AC Transit system. The six lines using 12th St. form the majority of the nine bus lines that connect East Oakland to Downtown Oakland. A seventh line to East Oakland, the NL, would be affected by the proposed Harrison Street project. In the peak hour, there are 54 buses traveling across 12th Street dam, nearly one bus per minute. **8**

If the proposed Bus Rapid Transit (BRT) line on International Boulevard is developed, it will use 12th Street and bus service on the route will increase further. BRT is planned to have very high frequency operations, perhaps as high as one bus in each direction every five minutes.

Significance of Delay on 12th St. Dam

Increased delay on 12th Street has an impact to AC Transit operations. It becomes more difficult and costly to provide the same bus service. If AC Transit's operating budget is constrained, delay can make it necessary to reduce service. However, delay also has an impact on the passengers using AC Transit, the automobile drivers who benefit from AC Transit passengers not driving, and to the City of Oakland's efforts to increase transit mode share and support transit.

We wish to stress that the projected 2-3 minute delays across 12th St. Dam are highly significant. Operationally, AC Transit often makes substantial efforts to reduce delay at a given location by as little as 15-30 seconds, so 194 seconds is a major impact. From the passenger's perspective, the average travel time on an AC Transit bus is 15-20 minutes, so a 2-3 minute delay creates a 10-20% increase in travel time. We doubt that most automobile drivers would regard analogous increases in travel times as unimportant. **9**

Increased Cost of Operations

AC Transit's full operating cost is $131 per hour of operation, so each minute of delay contributes to that cost. If it becomes necessary to operate additional buses to maintain the schedule, this would cost $250,000-$300,000 per year with no improvement in service (this might be described as running harder and harder to stay in the same place). Many AC Transit routes are tightly scheduled, with the minimum feasible running time and layover time at the end, so 2-3 minutes could force the addition of another bus. If delay on just two of the routes required the addition of one **10**

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bus apiece, the increased operating cost would be some $600,000 per year, in addition to increased operating costs incurred on the other four lines.

The information in the EIR is not sufficient to develop a precise estimate of the cost of the delay projected on the 12th St. roadway. The EIR does not include estimates of the delay at midday, on weekends, or at other times besides the peak. **10 cont.**

Aggregate Travel Time Impact with Other Projects Affecting the Same Bus Routes
The EIR also does not address the potential for aggregate impacts on the same bus routes as Measure DD projects. We asked for this information in our letter about the Notice of Preparation. Road narrowing or other projects elsewhere could delay the same bus routes as Measure DD, causing aggregate delays. We are concerned about this potential for all routes, but particularly for the 40 Foothill route. AC Transit service on Foothill Boulevard has already been delayed due to reduction in travel lanes on that street. We understand that the City is considering further narrowing of Foothill Boulevard, which could cause aggregate delays with this project. Potential aggregate impacts should be identified and addressed. **11**

Degradation of Service to Passengers
The impact on bus passengers is just as important as the impact on AC Transit. Bus passengers' trips would take longer. Some trips could become impossible, for example, buses might miss transfer connections that they would have otherwise have made. **12**

Degradation of the primary bus corridor to East Oakland also raises environmental justice issues. Passengers on these routes are overwhelmingly non-White and many are low income. It appears that they would absorb a disproportionate impact from improvements around Lake Merritt designed to benefit the city population as a whole. While auto drivers who now use 12th Street could seek routes that did not use the Dam, most transit passengers would not have this option. **13**

Degradation of bus service would also be inconsistent with Oakland's planning policies. Oakland has declared itself a "Transit First" city, pledging to prioritize improvements to transit. The Land Use and Transportation Element of Oakland's General Plan declares that the City should encourage transit and expedite the movement of transit vehicles. **14**

The City's policies would be especially undermined if passengers shifted from using the bus to driving alone. Close to 40% of AC Transit passengers had a vehicle available for trips they took on transit. Thus there is the potential for mode shifts in a negative direction. **15**

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Travel time impacts as CEQA Impacts

Although the language is somewhat ambiguous, the EIR seems to argue that the substantial delays in travel time it envisions should not be viewed as an impact under the California Environmental Quality Act (CEQA).

> "The City studied the 12th Street and Harrison Street corridors to understand how the project would affect traffic travel times in these areas, although the City does not have CEQA significance criteria for roadway delays because it believes that intersection analyses more accurately predict traffic impacts. Because traffic patterns change in response to traffic delays, the City believes that traffic impacts are better modeled by an intersection analysis for determining significance under CEQA. The travel time analysis was nevertheless performed to help understand how automobile, bus, and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components" (p.129).

16

AC Transit does not accept that view, at least with regard to bus travel. Instead, we believe that the delay in travel time is the primary impact on transit operations and passengers of this and other projects. Operational efficiency and passenger experience is affected by the overall ride more than the individual intersection. Travel time determines the cost of operation and the bus' competitiveness with other modes.

The EIR also argues that traffic patterns change in response to traffic delays. While this may be true for automobile drivers, buses generally cannot change routes in response to delays (we discuss this difficulty in Designing With Transit, p.5-6). Passengers expect the bus to operate on its designated route, even if that route has been made slower.

17

The City also considers a project which negatively impacts "alternative transportation" (such as bus transit) to have a CEQA impact. By imposing delays on large numbers of buses, this project would negatively impact alternative transportation.

18

Travel time delays, especially delays as large as those projected in this EIR, should be acknowledged as potentially significant negative impacts under CEQA and should be properly mitigated.

19

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Projected Changes in Travel Times, 12th St. Dam and Harrison St., Grand to 20th St (from Measure DD Draft EIR). **Note: All travel time is in seconds.**

Roadway Segment	Direction of travel	Hour	A: Existing travel time	B: Travel time—Existing plus Project (approx. 2010)	C: Travel time change from Existing to Existing plus Project Column B minus Column A	D: Travel time as of 2025 with cumulative development	E: Travel time change Existing plus Project to 2025 Column D minus Column B	F: Travel time change from Existing to 2025 Column D minus Column C
12th St., Madison St. to Foothill Boulevard	Eastbound toward Foothill	AM pk. hour	84.9	157.5	72.6	161.2	3.7	76.3
		PM pk. hour	114.9	199.0	84.1	270.0	71.0	155.1
	Westbound toward Madison	AM	170.8	291.7	120.9	364.4	72.7	193.6
		PM	164.0	265.4	101.4	273.1	7.7	109.1
Harrison St., 20th St. to Grand Avenue	Northbound toward Grand	AM	99.5	144.7	45.2	157.5	12.8	58.0
		PM	132.6	164.4	31.8	218.6	54.2	86.0
	Southbound toward 20th St.	AM	133.6	130.2	-2.6	164.7	34.5	31.0
		PM	136.1	134.0	-2.1	140.1	6.1	4.0

Potential Mitigations to Travel Time Impacts

The Value and Limitations of Transit Signal Priority

The EIR proposes (pp. 133 and 139) that transit signal priority be used along 12th Street to reduce AC Transit travel times. The EIR notes that "This action would reduce delays for AC Transit but would not completely eliminate increases in travel time along 12th Street and Harrison St.

AC Transit requested the use of transit signal priority in our NOP letter. We support signal priority on both corridors and believe it would be useful in reducing travel time. However, the improvements in travel time caused by transit signal priority would be insufficient to mitigate the level of delay indicated by the EIR for 12th St (Harrison St. is discussed in the last section of the letter).

20

As noted above, the volume of buses on the 12th Street Dam is very high, approaching one per minute (54 per hour) in the peak period. If the traffic signals tried to give

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priority to each bus, or even a large fraction of the buses on the roadway, the signals would be perpetually off-cycle and would never be able to reset to their normal cycle. Even with an aggressive signal priority protocol, most buses in the peak, when the roadway would presumably be most congested, would not be able to take advantage of it.

In addition, signal priority only reduces delay caused by signals. Signal priority by itself could not reduce delay caused by high traffic volumes and roadway congestion. We have clearly seen this limitation of signal priority in our operation of the San Pablo Avenue Rapid line (line 72R).

20 cont.

Additional Mitigations

Additional mitigations will be required to substantially reduce projected delay to an acceptable level and to mitigate the significant negative environmental impact that the delay in the current plan represents. AC Transit's proposed mitigations represent our best assessment, at this time, of effective mitigation measures. We have also considered how to minimize the effect of needed mitigations on other aspects of the Measure DD project.

AC Transit would be pleased to discuss these and/or other mitigations with the City of Oakland. Our goal is not necessarily to implement these specific mitigations, but rather to ensure that mitigations which would effectively reduce delay are implemented. In our letter on the Notice of Preparation for this EIR, AC Transit proposed these and similar mitigations. The City rejected all of our potential mitigations without providing adequate substitutes. Therefore, we now propose the following measures:

1. "Passive" transit signal priority - This would be in addition to the active signal priority of holding green lights and truncating red lights. In passive signal priority, signals are timed in the appropriate progression for buses rather than private cars. This system is used effectively on Market Street in San Francisco.

2. An Eastbound Bus lane in the 11th St. tunnel access to the roadway, with a dedicated bus signal at end of tunnel. This bus lane would be one of the existing three lanes, presumably the right lane. This approach would allow a bus to go around congestion in the 11th St. tunnel and move out of the tunnel quickly. Our preliminary evaluation is that this lane in the tunnel would obviate the need for a bus lane the full length of the roadway eastbound.

3. Westbound—A bus lane the length of the roadway. In the westbound direction, it does not appear possible to use queue jumps to circumvent congestion. Therefore we propose a dedicated bus lane for the approximately 1/3 mile length of the roadway. The lane should be approximately twelve feet wide. We do not believe that this would be an

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undue intrusion on park and recreational space adjacent to the planned six lane roadway.

4. Elimination of eastern crosswalk at the11th-12th/14th Street intersection The design for the new intersection of 11th Street, 12th Street, and 14th St. incorporates two crosswalks across the east-west roadways. However, the eastern crosswalk has the potential to cause substantial traffic delay, since use of the crosswalk would force all three roadways to stop. The crosswalk provides little pedestrian benefit, since it reaches an inactive, inaccessible area behind the Oakland Museum. The western crosswalk is very close to the eastern crosswalk. Eliminating this crosswalk and redesigning pedestrian paths to connect to the western crosswalk would also reduce the amount of paved surface in the area, which the City has raised as a concern.

21 cont.

As part of the process of developing a plan for effective operation across 12th Street, AC Transit is willing to consider relocation of stops and rerouting of bus lines in the area where useful and feasible.

Harrison Street, 20th Street-Grand Avenue

The impacts of the DD projects on Harrison Street between 20th Street and Grand Avenue present similar issues to those on 12th Street, albeit on a smaller scale. In this area, the City proposes to reconfigure the triangular intersections of Harrison Street, 20th Street, and Lakeside Drive into a single, perpendicular T intersection of Lakeside and Harrison. The number of lanes on Harrison Street would be reduced. We applaud the City's goal of improving access to the Lake in an area where it is currently difficult.

Four all day AC Transit lines operate through this segment; the 11 Oakland Ave., the 12 Grand, the 59 Piedmont, and the NL Macarthur. The NL is a limited stop Transbay trunk line operating every 15 minutes on weekdays, a line which AC Transit is working with the City to convert to Rapid service.

22

Additional delay would result from this project and the cumulative effect of other projects, particularly in the northbound direction. By 2025, northbound buses in the afternoon peak are projected to be delayed almost 1.5 minutes (86 seconds), and one minute in the morning peak (58 seconds).

We are seriously concerned about these delays. In addition, we are concerned about planning for this side of Lake Merritt proceeding in isolation from planning for the Grand-Macarthur Rapid. As noted above, this project would convert the existing NL to faster, more frequent Rapid service. AC Transit and the Alameda Congestion Management Agency developed a preliminary report on this proposal, and AC Transit now has adequate planning funds to develop a detailed plan for this Rapid. There are several outstanding issues in planning this area, such as the configuration of the roadway and the location of bus stops.

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Planning for the Measure DD project and the Grand-Macarthur Rapid in this area should proceed together. Otherwise, the City runs a very real risk of making costly changes and improvements which would need to be modified or eliminated later. We propose that no plan for Measure DD improvements in this area be finalized until the Grand-Macarthur Rapid plan is finalized.

22 cont.

AC Transit looks forward to continuing to work with the City of Oakland to structure projects which support both recreational and transit needs. If you have any questions about this letter, please contact Nathan Landau at 510-891-4792 or nlandau@actransit.org.

Yours Truly,

Nancy M. Skowbo

Nancy Skowbo
Deputy General Manager for Service Development

Cc: Jim Gleich
Mary King
Zia Dairkee
Kate Miller
Anthony Bruzzone
Tina Spencer
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Sean DiestLorgion
Nathan Landau

LETTER A1
AC Transit
Nancy Skowbo, Deputy General Manager for Service Development
September 10, 2007

Response A1-1: The introductory statement expresses an opinion on the merits of the project and states that AC Transit supports several elements of the project, including the development of multi-use paths around Lake Merritt and improvements to the pedestrian environment. The transit agency's support for these elements will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-2: AC Transit states that it is "concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam." This potential impact of the project is identified in the Draft EIR but is determined to be less than significant for the reasons provided on page 130 of the document. Although the City did not find the impact to be significant, the City nevertheless shares AC Transit's concern. As noted on page 133 of the Draft EIR, the City will continue to work with the agency to find mutually agreeable solutions in the spirit of the Transit Street Cooperative Agreement, which the comment cites as an example of collaboration and cooperation between the City and AC Transit.

The comment concludes by stating that AC Transit has had ongoing and constructive discussions with the City's Public Works Department about impacts and mitigations for the 12th Street roadway reconstruction and believes that the City has largely responded to the agency's concerns about impacts that would occur during the construction phase of the project. The comment does not pertain to the Draft EIR's environmental analysis so not further response is provided.

Response A1-3: The comment incorrectly states that Measure DD would provide funds to develop a park in the former 9th Avenue Terminal area. The park and waterfront trail at the 9th Avenue Terminal would be developed as part of the Oak to 9th Project as indicated in the project description (Figure III-10a, for example) and would be funded by development fees paid by that project. The Measure DD Implementation Project proposes to fund improvements at Estuary Park, which is located on the opposing bank of the Lake Merritt Channel from the Oak to 9th development site.

Response A1-4: Elements of the 12th Street reconstruction that are presented in the Project Description of the Draft EIR are identified, including narrowing of the 12th Street roadway. The comment states that the transit agency understands the City's desire to reduce the large amount of roadway in that area, but that the narrower roadway must be balanced with the need to maintain viable transit operations. The Draft EIR describes and analyzes the potential impacts of the project on transit operations on page 133. The City of Oakland decision-makers will consider these impacts and the opinions of AC Transit on the need to balance the project's impacts and benefits during review of the merits of the project.

Response A1-5: The comment states that AC Transit is concerned about projects that would take place in the area of 20th and Harrison Streets and the impacts that they would cause to bus service in this area. The transportation analysis of the Draft EIR considered the impacts of the project in combination with past, other current and probable near-term projects scheduled to complete by Year 2025, including AC Transit's Bus Rapid Transit improvements. The results of the impact analysis for bus service, including travel times and speeds, in the area around 20th and Harrison Streets are presented on page 139 of the Draft EIR. As the comment does not identify specific impacts that are of concern to the agency, no further response is necessary. Refer to Response to Comment A1-22 for additional information about bus service in the vicinity of 20th and Harrison Streets.

Response A1-6: The comment indicates that the increases in travel time identified in the Draft EIR may underestimate the actual delay for buses to the extent that buses need to pull into and out of traffic flow for stops. The analysis that evaluated travel times along the 12th Street and Harrison Street corridors was performed to help understand how automobile, bus and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components. No specific consideration was given to how bus travel time would be affected by the need to pull into and out of traffic flow for stops. The design of bus stops along both corridors would be such that buses would at least partially block the right lane. Re-entry into the flow of traffic should not be a significant problem for AC Transit operations. Variations in the actual travel time for AC Transit vehicles (compared to the results reported in the Draft EIR) would result from bus stop access and from routes that use only part of the routes that were analyzed.

Response A1-7: The methodology for analyzing travel times is described on page 108 of the Draft EIR as the Highway Capacity Manual arterial analysis method. This method is described in detail in the *Highway Capacity Manual* (Transportation Research Board 2000). The projections were presented in more disaggregated form in Appendix E. No analysis was performed for midday traffic conditions because the peak hours coincide with the commuter peaks and the determination of likely effects would be greatest during those peaks. The midday analysis would not inform the determination of significance in the impact analysis and thus was not performed.

Response A1-8: The comment identifies bus lines that currently operate along 12th Street and states that if AC Transit's proposed Bus Rapid Transit system is developed it would also use the 12th Street corridor. The information provided by the comment is included on page 116 of the Draft EIR and was considered in the Draft EIR's analysis. No revisions to the Draft EIR are necessary.

Response A1-9: The Draft EIR discloses that converting 12th Street from a limited access high-speed facility to a mixed mode transportation system that accommodates pedestrian activity around Lake Merritt would result in increased travel times along 12th Street for both autos and transit vehicles. The CEQA impacts of increased delay and decreased LOS at intersections are addressed in the Draft EIR. Although the City

does not have CEQA significance criteria for roadway delays because it finds that LOS intersection analyses more accurately predict traffic impacts, the City studied the corridor to understand how the project would affect traffic travel times in the area.

The estimated delays along 12th Street are recognized as important to AC Transit operations and passengers using the service. As stated in the Draft EIR travel times for all modes of travel within the corridor would increase by a similar amount and travelers would not be discouraged from using transit as a result of the project. Increases in travel times from the passengers' perspective would be noticeable as would travel times for automobile users. The City acknowledges that this is a potential concern for drivers and transit passengers alike but not a CEQA impact. Refer also to Response to Comment A1-12.

Response A1-10: Regarding the costs to operate transit service, costs will increase with or without the Measure DD Implementation Project. The decision to increase service along a route could be affected by the demand along the route, the attractiveness of other modes of travel, and other factors. AC Transit could decide to adapt to the increase in travel time by changing the schedule rather than by adding buses.

The purpose of the travel time analysis was to determine how automobile, bus and other traffic along these streets would be affected by the Lake Merritt and Lake Merritt Channel project components. The purpose of the analysis was not to provide information sufficient for AC Transit to develop a precise estimate of the cost of adding service to the corridor.

Response A1-11: In response to the statement that the Draft EIR does not address the potential for aggregated impacts on the same bus routes as the Measure DD project elements, the Draft EIR included an assessment of projects that were considered to be reasonably foreseeable. The existing lanes were assumed to be in place for Foothill Boulevard. Further narrowing of the travel lanes on Foothill Boulevard is not considered to be reasonably foreseeable.

Response A1-12: The comment states that increased travel time would impact passengers that use AC Transit lines because their trips would take longer and they might miss transfer connections. The City acknowledges that this is a potential operational concern for AC Transit but not a CEQA impact. The CEQA impacts of increased delay and decreased LOS at some intersections are addressed in the Draft EIR.

Although the City did not find the impact on travel time through the 12th Street corridor to be significant, it nevertheless shares AC Transit's concern with regards to impacts to bus passengers. As stated on pages 133 and 139, the City considered several potential options that might reduce bus travel times, including the addition of bus-only lanes or queue jump lanes, and the elimination of crosswalks. These measures were not recommended because they would have substantial impacts on traffic operations or pedestrian mobility. The Draft EIR recommends implementing a transit signal priority system along some transit routes, which would reduce but

not completely eliminate increases in travel time. Refer to Response to Comment A1-21 for a discussion of additional measures recommended by AC Transit. These measures will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-13: Environmental justice does not fall under the definition of environmental impacts in CEQA and therefore is not within the purview of the Draft EIR. *CEQA Guidelines* Section 15064 states: "Economic or social changes resulting from the Project shall not be treated as significant effects on the environment." In addition, *CEQA Guidelines* Section 15131 indicates that the socioeconomic effects of a project should not be considered significant environmental impacts in and of themselves: "Economic effects of a project shall not be treated as significant effects on the environment. An EIR may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the Project to physical changes caused in turn by the economic or social changes. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes."

As required by CEQA, the Draft EIR focuses on the physical effects of the project, which include the increase in travel time. These effects were found to be less than significant for the reasons stated on pages 130 and 139 of the Draft EIR. Nevertheless, the City shares AC Transit's concern with regards to impacts to bus passengers. Refer to Response to Comment A1-21 for a discussion of additional measures recommended by AC Transit to reduce travel time. These measures will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A1-14: The comment states that policies in the City's Land Use and Transportation Element (LUTE) encourage transit and the movement of transit vehicles and that degradation of bus service, as described in the Draft EIR, would be inconsistent with the City's transit policies. While the project would increase bus travel time in the 12th Street corridor, as described on pages 129-133 and 138-140 of the Draft EIR, a potential conflict with a single policy in a General Plan element does not inherently result in a *significant* effect on the environment within the context of CEQA. In addition, the City's General Plan has numerous policies addressing transportation issues (presented on page 121 of the Draft EIR). Policy T3.3, for example, states that the City should accept lower levels of service and a higher level of traffic congestion at Downtown intersections and intersections that provide direct access to Downtown locations. Downtown is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south and I-980/Brush Street to the west. This area includes much of the 12th Street corridor. The project is consistent with this policy.

Because the General Plan contains many policies, which may in some cases address different goals, some policies may compete with each other. The overall consistency of the project with the City of Oakland's policies is evaluated in Section IV.B, Planning Policy and in Appendix D of the Draft EIR. The comment is noted and the City of Oakland decision-makers, in deciding whether to approve the proposed project, will consider this information when determining whether on balance the project is consistent with the General Plan.

Response A1-15: Refer to Response to Comment A1-9.

Response A1-16: The Draft EIR applies the City's criterion of significance for transit, which the City developed in cooperation with AC Transit, that states that the project would have a significant impact on transportation if it would "generate added transit ridership that would increase the average ridership on AC Transit lines by 3 percent at bus stops where the average load factor with the project in place would exceed 125% over a peak thirty minute period." There has been no dispute that the project would not satisfy that criterion. Delays that would affect motor vehicle operations in general would have a similar effect on AC Transit operations and no special operational measures for AC Transit were considered necessary under CEQA. The Draft EIR went a step further than the normal process in Oakland for assessing impacts under CEQA and addressed corridor travel time in the spirit of disclosing additional information. However, the travel time analysis does not address a specific criterion of significance and thus does not lead directly to impact determinations. Refer also to Responses to Comment A1-12 and A1-21.

Response A1-17: The comment states that passengers expect the bus to operate on its designated route, even if that route has been made slower. Although this is likely true, route designations are changed routinely by AC Transit to accommodate changes in demand and other factors including travel time. AC Transit could change the designation of one or more routes along 12th Street if it would result in improved service for a majority of riders.

Response A1-18: The City's adopted criterion to which the comment refers reads, "Fundamentally conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle routes)." The Draft EIR finds that the project would not fundamentally conflict with transit policies because among other reasons it encourages many forms of alternative transportation, including the use of buses, by improving pedestrian linkages through the creation of a more pedestrian friendly and accessible environment in the Lake Merritt project area, including the 12th Street transit corridor.

The Draft EIR acknowledges that the project would increase travel time along 12th Street for the bus routes that travel this corridor but the traffic analysis also shows that the delays at existing intersections along these routes would not be affected or delays would be reduced (i.e., at International Boulevard and 1st Avenue, see Table IV.C-5 on page 125 of the Draft EIR). Although no mitigation is required, the City will continue to collaborate and cooperate with AC Transit to identify ways to

reduce transit delays and improve service in the project area. Refer to Response to Comment A1-21.

Response A1-19: The comment states that AC Transit is "concerned about the potential for Measure DD implementation to significantly degrade bus service to East Oakland via the 12th Street Dam," an impact of the project that is identified in the Draft EIR but is not considered significant for the reasons provided on page 130 of the document. Although the City did not find the impact to be significant, the City nevertheless shares AC Transit's operational concern. As noted on page 133 of the Draft EIR, the City will continue to work with the agency to find mutually agreeable solutions in the spirit of the Transit Street Cooperative Agreement, which the comment cites as an example of collaboration and cooperation between the City and AC Transit.

The comment correctly notes that transit bus travel times are impacted by poor intersection operations and that the impact compounds by traveling through congested corridors. While there is no significance criterion for bus transit travel times, the roadway changes identified as mitigation measures in the Draft EIR would reduce vehicle delay, which also then would reduce transit delay from unmitigated conditions. The intersection improvements identified in the Measure DD environmental studies would improve travel through the 12th Street area for all vehicles including buses, which make up 3 to 4 percent of the person trips and automobiles which make up the remaining person trips.

Response A1-20: It is acknowledged that providing transit signal priority along 12th Street and Harrison Street would be insufficient to fully mitigate the level of delay indicated by the EIR for 12th Street or Harrison Street. The Draft EIR states on page 133, "This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street." The Draft EIR states on page 139, ". . . the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and Harrison Street." Refer to Response to Comment A1-21 for additional recommendations the City is considering to reduce travel time.

Response A1-21: The City has evaluated the feasibility of implementing AC Transit's requested design modifications for reducing travel time along the 12th Street corridor and agrees to consider passive transit signal priority and changes to eastbound bus lanes. These design details do not substantially change the project and would not create new impacts.

The City declines to modify the bus lane in the westbound direction because the westbound bus lane would have significant implications for the project design, would be counter to project objectives (e.g., it would reduce the area of park land created), and would likely provide the least benefit for travel time of the measures proposed by AC Transit. Right-of-way constraints prevent widening the street east of the Lake Merritt Channel Bridge. Widening the bridge itself would reduce open water below, reduce open sky for pedestrians below and be very expensive. Without widening the Lake Merritt Channel Bridge a westbound bus lane could be

extended only from just west of the bridge to the 11th-12th/14th Street intersection. Parking would have to be eliminated on the north side of 12th Street between the bridge and the 11th-12th/14th Street intersection and the roadway would need to be widened into the park. The incremental reduction in travel time, which was not a significant impact of the project, does not justify the impacts (e.g., loss of parking, reduced size of park, etc.) that the requested change would make.

An analysis was performed to determine the extent to which the measures proposed by AC Transit could be implemented without causing significant intersection impacts. The following scenarios were evaluated:

1. Recommendations proposed in the DEIR (with refinements in signal phasing to better accommodate pedestrian movements)[1]

2. Bus lane on the 11th Street (with crosswalks proposed in the DEIR)

3. Bus lane on the 11th Street and elimination of southeast crosswalk

Scenarios 2 and 3 would provide continuation of the bus lane through the signal at the 11th-12th/14th Street intersection, after which buses would share lanes with other motor vehicles.

The analysis of traffic operations showed that a relatively long cycle length[2] would be required during the AM peak hour for all the scenarios above. The scenarios intended to at least partially accommodate AC Transit's request (No. 2 and 3, above) would require relatively long cycle lengths during the PM peak hour. The DEIR recommendation (No. 1, above) would allow a signal cycle half the long cycle during the PM peak hour.

A short cycle length is desirable for two reasons. First, short cycle lengths provide shorter wait times for pedestrians and result in better pedestrian compliance with traffic regulatory devices. Second, short cycle lengths generally result in shorter vehicle queue lengths than long cycle lengths.

To compare the DEIR recommendation with the other scenarios, a long cycle length was analyzed and would provide lower delay for motor vehicles than the shorter cycle length suggested to better accommodate pedestrians. The analysis showed that all scenarios could be implemented without causing significant level of service impacts at the 11th-12th/14th Street intersection. The results of the analysis

[1] The DEIR analysis assumed pedestrians would cross the southeast leg of the 11th-12th/14th Street intersection during the signal phase that would serve eastbound right turning traffic from 11th Street to 12th Street. The signal phasing concept was revised to provide a separate pedestrian phase that would provide a protected phase for pedestrians. Details of the revised signal phasing concept are provided in the Appendix.

[2] The DEIR analysis evaluated 50 and 100 second cycle lengths for the intersections along the 12th Street – 14th Street corridor. The analysis conducted for the updated analysis showed that a 100-second cycle length would be required during the a.m. peak hour but that a 50-second cycle length would be possible during the p.m. peak hour.

are summarized in the table, below. Detailed analysis worksheets are provided as Appendix A.

Intersection Levels of Service – Cumulative (2025) Conditions for 11th-12th St/14th Street Intersection

Scenario	AM Peak Hour		PM Peak Hour	
	LOS[a]	Delay[b]	LOS[a]	Delay[b]
DEIR Recommendation (50 second PM signal cycle)	B	14.6	D	37.8
DEIR Recommendation (100 second PM signal cycle)	B	14.6	C	28.2
Bus lane on the 11th Street	B	14.9	C	32.4
Bus lane on the 11th Street and elimination of southeast crosswalk	B	16.7	C	34.3

Notes:
[a] LOS = Level of Service
[b] Average control delay in seconds per vehicle
[c] Defined as a downtown intersection
Source: Dowling and Associates, 2007.

The City will work with AC Transit to determine the feasibility of implementing the measures included in the analysis. The bulleted list of recommendations on page 133 of the Draft EIR is revised as follows:

Transit Recommendations

- The City should provide <u>active and/or passive</u> transit signal priority to reduce travel times along 12th Street and Harrison Street. This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street.
- <u>The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.</u>

The bulleted list of recommendations on pages 139-140 of the Draft EIR is revised as follows:

<u>Transit</u> Recommendations

- Implementation of <u>active and/or passive</u> transit signal priority as described in the previous recommendations for transit service would reduce delays for AC Transit. Nevertheless, the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and Harrison Street. ~~While adding bus-only lanes or queue jump lanes, or eliminating pedestrian crosswalks are feasible, they are not recommended because they would have substantial impacts on traffic operations or pedestrian mobility, and in most cases have additional costs.~~

- The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.

Response A1-22: The comment states that the increases in transit travel time in the vicinity Harrison Street between 20th and Grand Avenue are of concern to AC Transit. It also recommends that planning should be coordinated for the Measure DD Implementation Project and the Grand-Macarthur Rapid Project. The City and AC Transit are engaged in ongoing discussions to resolve transit issues associated with their respective proposed projects, including the Measure DD Implementation and Grand-Macarthur Rapid Projects.

Letter
A2

Making San Francisco Bay Better

August 27, 2007

Elois A. Thornton
City of Oakland
Community and Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: BCDC Inquiry File No. AL.MC.7517.2. Juris. Det. File No. AL.AL.6000.3. Measure DD Implementation Project Draft Environmental Impact Report. (State Clearinghouse #2006122048.)

Dear Ms. Thornton:

Thank you for the opportunity to comment on the Measure DD Implementation Project Draft Environmental Impact Report (DEIR) for the City of Oakland. The DEIR is dated July 2007, and was received in our office on July 24, 2007. The Commission has not reviewed the DEIR, so the following staff comments are based on the *San Francisco Bay Plan* (Bay Plan) and the McAteer-Petris Act and staff review of the DEIR.

Jurisdiction. Chapter IV, page 95 of the DEIR defines the BCDC jurisdiction as, "all areas of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways." It states that "Measure DD includes waterfront improvements within 100 feet of the shoreline," that will require BCDC permit approval. In addition to the above description of the BCDC jurisdiction, the EIR should state that the southern portion of the Lake Merritt Channel (to the 7th Street Pump Station) falls within The Commission's bay jurisdiction, and that Measure DD improvements involving placement or removal of fill in the Bay will require BCDC permit approval. **1**

It is not clear from the DEIR if the Measure DD improvements include an operational 7th Street tide or flood gate. If a tide or flood gate is not included, the EIR should recognize that changes may result to the Commission's jurisdiction in the Channel and Lake. **2**

Public Access. To be consistent with the discussion of other applicable regulatory documents in the Planning Policy section (Chapter IV, Section B), the EIR should reference the Bay Plan policies on Public Access that will apply in BCDC permits issued for Measure DD projects. **3**

Fish, Other Aquatic Organisms and Wildlife. BCDC's Bay Plan findings and policies on Fish, Other Aquatic Organisms and Wildlife address protection of these resources. The summary of the McAteer Petris Act in the Biological Resources section (page 204) of the EIR should also state that, in reviewing permit applications for projects within its jurisdiction, BCDC relies on these Bay Plan policies to ensure protection of biological resources. **4**

Tidal Marshes and Tidal Flats. BCDC's Bay Plan findings and policies also address Tidal Marshes and Tidal Flats. These policies state, in part, "Projects should be sited and designed to avoid, or...minimize adverse impacts on any transition zone present between tidal and upland habitats." Additionally, the policies require that "Any tidal restoration project... include clear **5**

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and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project."

The DEIR states on page 35 that, "Measure DD Implementation Project Components along the channel are intended to… restore wetlands," and Figure III-4 appears to indicate that restoration of tidal marsh is proposed for the Channel south of 7th Street. Proposed improvements at the 66th Avenue Gateway (page 57) also appear to potentially affect tidal marsh and transition zone habitat. The EIR should recognize Bay Plan policies on Tidal Marshes and Tidal Flats that will apply to these Measure DD project components. **5 cont.**

Sea Level Rise and Safety of Fills. Bay Plan findings and policies anticipate the need for planning associated with safety of fills and sea level rise. The Safety of Fills findings recognize that "Bay water levels are likely to increase in the future because of a relative rise in sea level… Relative rise in sea level is the sum of: (1) a rise in global sea level and (2) land elevation change (lifting and subsidence) around the Bay." Policy 5 states, in part, "…structures on fill or near the shoreline should be above the highest estimated tide level for the expected life of the project water level during the expected life of the project or be sufficiently protected by levees…" Additionally, Policy 6 states, "local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas or in areas that will become flood prone in the future, and that structures and uses that are approvable will be built at stable elevations to assure long-term protection from flood hazards." **6**

Projects in BCDC jurisdiction that involve bay fill must be consistent with the Bay Plan policies on the safety of fill and sea level rise. The EIR should include these Bay Plan policies in the Regulatory Framework discussion in Chapter IV, Section H (beginning on page 249).

Increased Tidal Action in Lake Merritt Channel. In the discussion of hydrology and water quality impacts (pages 261 and 263), the DEIR states that the replacement of culverts under 12th and 10th streets with clear-span bridges, and reconfiguration of the 7th Street channel would double (approximately) the flow rate through Lake Merritt Channel. Based on studies of the flow changes, the DEIR concludes that this "ability of the channel to convey more water out of the Lake…could alleviate flooding conditions." The EIR should specify what factors these studies analyzed to project future flow rates and flooding conditions. If the studies are based solely on past tidal ranges, they may not sufficiently describe potential flooding impacts. For example, combined conditions of increased tidal action on the Channel and Lake, storm surge and climate change-related sea level rise could affect flooding risk for the project area. The EIR should consider these additional factors in assessing the hydrology and water quality impacts of the Measure DD improvements. **7**

Additionally, the description of impacts to biological resources (beginning page 210), should address whether tidal flow changes to the Lake and Channel will significantly affect habitats in any of the project areas. **8**

If you have any questions regarding this letter, or any other matter, please contact Joe LaClair by phone at 415 352-3656 or email joel@bcdc.ca.gov.

Sincerely,

SARA POLGAR
Planner

LETTER A2
Bay Conservation and Development Commission (BCDC)
Sara Polgar, Planner
August 27, 2007

Response A2-1: The comment cites text on page 95 of the Draft EIR that defines the Bay Conservation and Development Commission's (BCDC) jurisdiction and recommends that the Draft EIR clarify the boundary of BCDC's authority in the southern portion of the Lake Merritt Channel. It also recommends that the Draft EIR state that project actions that involve placement or removal of fill in the Bay will require BCDC permit approval. The City agrees to make the recommended changes, which clarify the permit process for the project but do not alter the analysis or conclusions of the EIR. The third paragraph on page 95 of the Draft EIR is revised to include this information. Because this paragraph is revised in response to more than one comment refer to Response to Comment A2-3 below for the revised text.

Response A2-2: The comment requests that the Draft EIR clarify whether a tide or flood gate is included at 7th Street Pump Station. The second paragraph on page 36 of the Draft EIR is revised as follows:

This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. <u>The bypass channel would be designed and managed to retain the tidal and flood control functions of the pump station. To ensure that the flood control function of the 7th Street Pump Station is not compromised, the new bypass channel would include a hydraulic gate that would be closed when operation of the pumps is required to lower the water level in the lake.</u>

Response A2-3: The comment requests that the Draft EIR reference the Bay Plan policies on public access that will apply in BCDC permits. Accordingly, the Draft EIR on page 95 is revised as follows:

e. San Francisco Bay Plan. The San Francisco Bay Plan[9] (Bay Plan) is a policy tool that, under the provisions of the McAteer-Petris Act, allows the San Francisco Bay Conservation and Development Commission (BCDC) to "exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction," an area that includes all of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways associated with the Bay. The Bay Plan stipulates: "Any public agency or private owner holding shoreline land is required to obtain a permit from the Commission before proceeding with (shoreline) development." <u>The Bay Plan contains findings and policies that will apply in BCDC permits for Measure DD project components</u>

within the commission's jurisdiction. Examples of applicable policies include those related to public access, the placement and removal of fill in the Bay, sea level rise and the safety of fills, the protection of fish, other aquatic organisms and wildlife, and tidal marshes and tidal flats, among others. Implementation of the proposed project would require BCDC permit approval for development within the 100-foot shoreline band. Measure DD includes waterfront improvements within 100 feet of the shoreline~~.~~, including areas along the Oakland Estuary and the southern portion of the Lake Merritt Channel, downstream of the 7th Street Pump Station.

Response A2-4: The comment requests that the EIR state that, in reviewing permit applications for projects within its jurisdiction, BCDC relies on findings and policies on Fish, Other Aquatic Organisms and Wildlife in the Bay Plan to ensure protection of biological resources. The City agrees to include the findings and policy information and revise the Draft EIR on page 204 as follows:

(4) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to enforce this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters. In reviewing permit applications, BCDC relies on findings and policies on fish, other aquatic organisms and wildlife in the Bay Plan to ensure protection of biological resources.

Response A2-5: The comment requests that the EIR recognize that policies on tidal marshes and tidal flats will apply to Measure DD project components. The City agrees to include the additional policy information that BCDC will consider during the permitting process. Refer to Response to Comment A2-3 for revisions to the text.

Response A2-6: The comment requests that the EIR recognize that policies on sea level rise and the safety of fills will apply to Measure DD project components. The City agrees to include the additional policy information that BCDC will consider during the permitting process. Refer to Response to Comment A2-3 for revisions to the text. Refer to Response to Comment A2-7 for additional discussion of sea level rise.

Response A2-7: The 7th Street Pump Station provides flood protection for areas upstream of 7th Street by allowing water levels in Lake Merritt to be lowered during storm events that coincide with high tides. This function and the operation of the 7th Street Pump Station are described on pages 35 (Project Description) and 246 (Hydrology and Water Quality) of the Draft EIR. A hydraulic gate in the new bypass channel at the 7th Street facility would be closed when operation of the pumps is required to lower the water level in the lake, which currently occurs about 1 percent of the time (i.e., a few days per year). Rising average tidal levels downstream of the flood station may increase the frequency with which the pumps would need to operate but increased operation would not compromise their function. The text is revised as indicated in Response to Comment A2-2 to clarify the operation of the 7th Street Pump Station.

Under certain conditions the pumps currently lower the water level in the Channel faster than it can be replenished by flows through the culverts beneath 10th and 12th Street. Removal of the culverts at 10th and 12th Streets, lowering of the channel at 12th Street, and creation of an open channel in these areas as part of the project (page 35 of the Draft EIR) would improve the flow of water between the lake and the pump station. These actions would help alleviate upstream flooding by allowing the pumping system to operate more efficiently.

Coastal flooding is acknowledged as a potential impact on pages 246 and 261 of the Draft EIR. As with many facilities built near the shore of San Francisco Bay, rising sea levels associated with global climate change could ultimately affect the pump station if they rise to extreme levels. The pump station's function would be compromised if, for example, extreme high tides overtopped the facility. However, the flood control components and operation of the 7th Street Pump Station itself would not be altered by the project. In addition, the project is not constructing housing, high occupancy, or sensitive facilities within the zone that could be affected by rising sea levels. Thus, the impact of the project would be less than significant. The text at the bottom of page 261 of the Draft EIR is revised as follows:

- <u>As with many facilities built near the shore of San Francisco Bay, rising sea levels associated with global climate change could, in the long-term, affect project facilities and existing infrastructure such as the 7th Street Pump Station that are designed to protect them from flooding. The pump station's function would be compromised if, for example, tidal levels overtopped the facility. However, the flood control components and operation of the 7th Street Pump Station itself would not be altered by the project. New trails are being located above the current reach of tidal action, with additional freeboard which will accommodate some future sea level rise. In addition, the project is not constructing housing, high occupancy, or sensitive facilities within the zone that could be affected by flooding or rising sea levels.</u>

Response A2-8: Increased tidal flows would not cause adverse changes to the open water or upland habitats (described on pp. 188-189 of the Draft EIR) that occur in the vicinity of Lake Merritt or the Lake Merritt Channel. The increased tidal flows would have no effect on the upland habitat, which is landscaped parkland. The new flow regime would not *adversely* affect the relevant water quality characteristics of the open water habitat such as salinity, temperature and dissolved oxygen. Water quality would be improved by the greater exchange rate between Lake Merritt and the estuary and by newly created tidal wetlands. As the channel is not a corridor for the movement of migratory fish, the increased flow rate would have no effect on migratory fish species. The following text is inserted on page 216 of the Draft EIR at the end of subsection IV.F.2.c(3):

<u>The increased tidal flows that would occur as a result of the proposed modifications to the Lake Merritt Channel are not expected to cause adverse changes to the open water habitat in Lake Merritt or the Lake Merritt Channel. Increased tidal flows would not adversely affect the relevant water quality characteristics of the open water habitat such as salinity, temperature, and dissolved oxygen. Water quality, especially dissolved oxygen, would be improved by the greater exchange rate between</u>

Lake Merritt and the estuary and by newly created tidal wetlands in the channel, which would benefit wildlife.

The text at the beginning of subsection IV.F.2.c(4) on page 216 of the Draft EIR is revised as follows:

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. As the channel is not a corridor for the movement of migratory fish, the proposed changes to Lake Merritt and Lake Merritt Channel would not have an adverse effect on migratory fish species. Several species of migratory waterbirds have been observed using the Lake Merritt Channel during the winter (approximately October through March), often in flocks of 40 to 70 birds (e.g., scaup, common goldeneye). A 2004 study of waterbird use and disturbance response within Berkeley's Aquatic Park found that disturbance sensitivity was positively related to flock size, with large flocks flushing more readily than smaller ones.[37] Although no such studies have been conducted at the Lake Merritt Channel, LSA observed a flock of approximately 50 common goldeneyes swimming away from a group of schoolchildren crossing the pedestrian bridge during the January 19 site visit, indicating sensitivity to disturbance. Human-caused disturbance negatively affects wintering ducks by causing the expenditure of energy (i.e., flying or moving away from the source of disturbance) that would otherwise be used for behaviors necessary for survival, such as resting or feeding.[38] Repeated or periodic disturbance would cause a greater expenditure of energy and thus have a greater effect on wintering birds than singular events.

Letter
A3

COUNTY OF ALAMEDA
PUBLIC WORKS AGENCY
399 Elmhurst Street • Hayward, CA 94544-1307
(510) 670-5480

September 10, 2007

Ms. Elois A Thornton, Planner IV
City of Oakland,
Community and Economic Development Agency
Planning Division
250 Frank Ogawa Plaza, Suite 3315,
Oakland California 94612
Email: eathornton@oaklandnet.com
(510) 238-6284

RE: City of Oakland Measure DD Implementation Project
Environmental Impact Report (SCH # 2006122048

Dear Ms Elois:

The Alameda County Flood Control and Water Conservation District (District) has reviewed the City's Environmental Impact Report entitled: *City of Oakland Measure DD Implementation Project Environmental Impact Report* and has the following comments:

The District owns and maintains several flood control facilities within the proposed project limits. These facilities include, but not limited to, District designated Zone 12 Lines B, C, and Line D. These creeks for the most part, flow in underground culverts that outfall at Lake Merritt. In addition the District owns and operates a pump station located on the outfall channel at 7th Street crossing.

The proposed project *Group 1 Lake Merritt and Lake Merritt Channel Improvements* described in the EIR pages 27-29 Table III-1 of the EIR could potentially result in significant impacts to District facilities. The proposed reconstruction and construction of the retaining walls along the banks of Lake Merritt could potentially undermine the integrity of existing culvert outfalls. This is a significant construction related impact requiring mitigation. Please provide adequate explanation of how the City proposes to mitigate this impact. **1**

The District owned pump station at 7th Street crossing currently provides effective flood protection to a large area within and outside the proposed project limits. Modifications and changes proposed (described on page 39 and shown on Figure III-4 and in section g page 365 of the EIR) could significantly affect the pump station structure and operations; and on page 263 the EIR describes "doubling of the flow rate through the Lake Merritt channel". There are several potential ramifications to the changes proposed: **2**

1) The new bypass channels would potentially change the hydrology at the pump station requiring redesign and significant operational changes of the facility;
2) There is no clarification of how water levels in the bypass channel will be maintained to support boat traffic. The channel is under tidal ebb and flow.

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A3
cont.

Comments –City of Oakland Measure DD EIR
Sept 10, 2007

3) The new bypass channels adjacent to the 7th Street Pump Station will require continuous maintenance. The EIR is unclear on how the City proposes to maintain the facility without compromising the flood protection functions of the pump station.
4) The District is concern about the potential safety and liability associated with the changes described in the EIR.

2 cont.

None of these significant issues requiring mitigation was adequately addressed in the EIR. In fact, it was concluded on page 258 in the checklist item that "it is less than significant". The District disagrees and requests that these issues be adequately addressed before approval of the EIR.

Under (*Group 4) City–Wide Creek Restoration, Preservation and Acquisition (described on pages 58 and on several other sections of the EIR).* The District is responsible for nearly all the major creeks and channel in the City of Oakland. Many of these creeks are located in high density population centers that may become prone to flooding with significant changes as described in the documents (i.e.; daylighting underground creeks). Potential impacts associated with this activity have not been addressed in the EIR. Please provide adequate mitigation. The District also requests that improvements and/or, restoration on any of these creeks that affect District facilities should be coordinated with the District hydrologist.

3

On pages 287-308: The EIR describes occurrences of high levels of various hazardous compounds, including lead at locations within the project limits. Yet no remediation other than citations of various local and state regulations governing these materials was provided. There is potential risk of these "localized" occurrences especially in the Lake Merritt Channel being transported (with tidal flows) into the lake with excavation and widening of the channel. This will potentially affect the wildlife resources occurring in the lake. Remediation is required.

4

The District requests copies of the technical studies for the 7th St. bypass channel concept including those prepared by Rajappan & Meyer Consulting Engineers 2007 *Lake Merritt conveyance capacity 1826-1827 Hydraulic modeling prepared for the City of Oakland 17 January.*

5

The District appreciates the opportunity to provide comments on the EIR and supports the overall goal of improving Lake Merritt and its environs. This comment letter is being sent electronically and by US Postal Services.

Yours truly,

Kwablah Attiogbe,
Environmental Services Supervisor

KA

LETTER A3
Alameda County Flood Control and Water Conservation District
County of Alameda Public Works Agency
Kwablah Attiogbe, Environmental Services Supervisor
September 10, 2007

Response A3-1: The comment states that the reconstruction and construction of retaining walls along the shore of Lake Merritt could potentially impact the integrity of the Alameda County Flood Control and Water Conservation District's underground culverts that outfall at Lake Merritt. The comment seeks assurance that these facilities will not be damaged during project construction activities. Implementation of the City's Uniformly Applied Development Standard Conditions of Approval for the project will ensure that District facilities are not be damaged.

The City's Conditions of Approval are incorporated as part of the project as explained on page 64 and 65 of the Draft EIR. Condition 75, provided on page 257 of the Draft EIR, requires that the City obtain all necessary regulatory permits and authorization from the District prior to construction and comply with all conditions issued by the District. Issuance of permits and compliance with the District's conditions will ensure that the District's facilities are not damaged. The last paragraph on page 261 of the Draft EIR is revised as follows to clarify this point:

Substantial quantities of new impervious surfaces, which could increase runoff rates and velocities (and potentially flooding), would not be created by Measure DD project components. The integrity and function of existing flood control and stormwater conveyance facilities operated by the Alameda County Flood Control and Water Conservation District, such as stormwater outfalls at Lake Merritt, would be ensured by obtaining permits and authorizations from the District prior to construction as required by Condition of Approval 75. ~~Construction of housing is not a proposed element of the project, and no new residential development would be subject to flooding.~~ Therefore, no substantial impact related flood hazard or redirection of flood water would occur with the proposed Measure DD components.

Response A3-2: The comment states that for the 7th Street Pump Station significant issues requiring mitigation were not adequately addressed in the Draft EIR. The comment identifies concerns that the new bypass channel at the 7th Street Pump Station could potentially change the hydrology of the pump station thereby affecting the safety and flood control functions of the pump station. The comment also requests clarification of how water levels would be maintained to support boat traffic.

The proposed modifications to the 7th Street Pump Station and Lake Merritt Channel are described on pages 35 and 36 of the Draft EIR. As noted therein, the 7th Street project components have been designed to the conceptual stage. The environmental analysis of the Draft EIR relied on studies prepared for this early stage of project development, including the hydraulic analyses cited on pages 261

and 263 of the Draft EIR. The studies, the hydraulic model of the Channel, and the conceptual designs were developed in close cooperation with Alameda County Public Works staff, including their hydrologist, design engineers, and operations staff. The studies conclude that the proposed modifications to the Lake Merritt Channel would improve flood control and safety. Therefore, no mitigation is recommended for these issues. Also refer to Response to Comment A2-2 for revised text that explains how the flood gate in the bypass channel would function.

Additional designs for the bypass of the 7th Street Pump Station are required and will be prepared before the project can be permitted and constructed. As required by Condition of Approval 75, structures within the floodplain or floodway, such as the 7th Street Pump Station, are subject to the regulatory permits and authorizations from the District. Compliance with the District's requirements would ensure that the flood control functions of the pump station are not adversely affected by the project. These studies would also be used to determine how water levels would be maintained for recreational boaters so as not to interfere with the flood control function of the pump station. To clarify that this process is required as part of the project, the text of the EIR is revised on pages 263 and 264 as follows:

These three components are designed to improve tidal exchange between Lake Merritt and San Francisco Bay by clearing and broadening the channel to approximately 100 feet at the outlet from Lake Merritt and at 10th Street. New clear-span bridges would be constructed after removal of existing culverts under 12th and 10th streets. ~~and by reconfiguring the channel at 7th Street~~, The proposed changes would ~~resulting in~~ approximately double~~ing~~ the flow rate through the Lake Merritt Channel in this area.[50, 51] These components are also intended to improve pedestrian and bicycle circulation in the area of the Channel, and along with other components, enhance and improve the environment of Lake Merritt and surrounding parks. Redesign of the Channel at the Lake Merritt Flood Control Station at 7th Street is at the conceptual design stage. As noted previously, hydraulic studies conducted at this stage of project development indicate that the proposed changes to the Lake Merritt Channel would help alleviate flooding conditions. Nevertheless, as required by Condition of Approval 75 this project component would be required to obtain all necessary permits and authorizations from the Alameda County Flood Control and Water Conservation District prior to construction to ensure that the operation of the flood control facilities at 7th Street would not be adversely affected by the proposed action. Topics of wildlife, aquatic life, vegetation, landscaping, creek restoration, U.S. Army Corps of Engineers Section 404 (filling and grading in wetlands) permitting, California Department of Fish and Game Section 1604 – Streambed Alteration Agreements, and San Francisco Bay Conservation and Development Commission (BCDC) requirements are addressed in the Biological Resources section of this DEIR.

Response A3-3: The comment incorrectly states that potential flooding impacts associated with the City-Wide Creek Restoration, Preservation and Acquisition Group have not been addressed in the Draft EIR. Flooding issues associated with all project components, including creek restoration, preservation and acquisition activities, are analyzed on page 261 of the Draft EIR. As noted therein, activities associated with the City-wide Creeks group of projects are intended, in part, to reduce flooding. In addition, the project incorporates numerous Conditions of Approval, as described on pages 253 to 257 of the Draft EIR, to ensure that project activities, including creek

restorations, will not create significant flooding impacts. Thus, the Draft EIR concludes that potential flooding impacts are less than significant.

The comment also requests that the City coordinate with the District's staff if creek restoration or improvement activities would affect District facilities. The studies, the hydraulic model of the Channel, and the conceptual designs upon which the analysis in the Draft EIR is based were developed in close cooperation with Alameda County Public Works staff, including their hydrologist, design engineers, and operations staff. The City will continue to coordinate with District staff during the permitting and authorization process as required by Condition of Approval 75, which is included as part of the project.

Response A3-4: The comment incorrectly states that the Draft EIR relies on local and State regulations to address the presence of hazardous compounds that may be encountered during construction. It also expresses concern that disturbance of contamination in Lake Merritt Channel could adversely affect wildlife in Lake Merritt and states that mitigation is required.

Several Conditions of Approval, which go beyond regulatory requirements, are identified on pages 298 and 299 of the Draft EIR. Conditions of Approval 50 and 52, for example, require the preparation of Phase I and Phase II studies and remedial actions, as necessary, conducted in consultation with local, State and federal environmental regulatory agencies. These Conditions of Approval are included as part of the project, as noted on pages 64 and 65 of the Draft EIR, and would reduce potential impacts associated with hazardous compounds in soil or other environmental media. Implementation of these measures would ensure that project activities do not adversely affect water quality and wildlife resources at Lake Merritt.

Response A3-5: The comment requests copies of the technical studies for the 7th Street bypass channel concept. The studies are part of the administrative record for the project, which is available at the City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315. The City has provided copies of the documents to the District as part of the earlier cooperative design process.

Letter
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EAST BAY
MUNICIPAL UTILITY DISTRICT

August 28, 2007

Elois A. Thornton, Planner IV
City of Oakland
Community and Economic Planning Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: Draft Environmental Impact Report for the City of Oakland Measure DD Implementation Project

Dear Ms. Thornton:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Draft Environmental Impact Report (EIR) for the City of Oakland Measure DD Implementation Project. EBMUD has the following comments.

WATER SERVICE

EBMUD's Central and Pressure Zone, with a service elevation range of 0 to 100 feet, and Aqueduct Pressure Zone, with a service elevation range of 100 to 200 feet, serve the area incorporated in the Measure DD Project. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine the costs and conditions of providing water service to the project. Engineering and installation of water mains and services requires substantial lead time, which should be provided for in the project sponsor's development schedule. **1**

Since several of the proposed project areas have a potential to contain contaminated soil and/or groundwater, the project sponsor should be aware that EBMUD will not install piping or services in contaminated soil or groundwater (if groundwater is present at any time during the year at the depth piping is to be installed) that must be handled as a hazardous waste, or that may be hazardous to the health and safety of construction and maintenance personnel wearing Level D personal protective equipment. EBMUD will not install piping or services in areas where groundwater contaminant concentrations exceed specified limits for discharge to the sanitary sewer system and sewage treatment plants. **2**

The project sponsor must submit copies to EBMUD of all known information regarding soil and groundwater quality within or adjacent to the project boundary and a legally sufficient, complete and specific written remediation plan establishing the methodology, planning and design of all necessary systems for the removal, treatment, and disposal of contaminated soil and groundwater. EBMUD will not design piping or services until

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soil and groundwater quality data and remediation plans have been received and reviewed, and will not start underground work until remediation has been carried out and documentation of the effectiveness of the remediation has been received and reviewed. If no soil or groundwater quality data exists, or the information supplied by the project sponsor is insufficient, EBMUD may require the project sponsor to perform sampling and analysis to characterize the soil and groundwater that may be encountered during excavation or EBMUD may perform such sampling and analysis at the project sponsor's expense. If evidence of contamination is discovered during EBMUD work on the project site, work may be suspended until such contamination is adequately characterized and remediated to EBMUD standards.

2 cont.

WASTEWATER

On page 325, second paragraph, please delete the sentences stating, "This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater process by EBMUD's Main Wastewater Treatment Plant." While there is available capacity during dry weather, this volume is meant to ensure adequate capacity during wet weather events. The phrasing in the Draft EIR incorrectly implies that EBMUD does not fully utilize the available capacity.

EBMUD's Main Wastewater Treatment Plant is anticipated to have adequate dry weather capacity to treat the proposed wastewater flow from this project, provided this wastewater meets the standards of EBMUD's Environmental Services Division. However, the City of Oakland's Infiltration/Inflow (I/I) Correction Program set a maximum allowable peak wastewater flow from each subbasin within the City and EBMUD agreed to design and construct wet weather conveyance and treatment facilities to accommodate these flows. EBMUD prohibits discharge of wastewater flows above the allocated peak flow for a subbasin because conveyance and treatment capacity for wet weather flows may be adversely impacted by flows above this agreed limit.

3

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD would request that the City of Oakland include in its conditions of approval a requirement that the project sponsor comply with the Landscape Water Conservation Section, Article 10 of Chapter 7 of the Oakland Municipal Code. EBMUD staff would appreciate the opportunity to meet with the project sponsor to discuss water conservation programs and best management practices applicable to the integrated projects. A key objective of this discussion will be to explore timely opportunities to expand water conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

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cont.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

David J Rehnstrom

FOR William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:TNS:sb
sb07_217.doc

LETTER A4
East Bay Municipal Utility District (EBMUD)
William Kirkpatrick, Manager of Water Distribution Planning
August 28, 2007

Response A4-1: The comment states that the City should coordinate with EBMUD as the project plans are finalized to determine the costs and conditions of providing water service to the project. The comment is noted.

Response A4-2: The comment states that evidence of remediation of known contamination or information to confirm the absence of contamination must be provided to EBMUD before the district will design or install pipelines for the project in potentially contaminated areas. The City's Standard Condition of Approval 50: Phase I and/or Phase II Reports and Standard Condition of Approval 52: Environmental Site Assessment Reports Remediation are included as part of the project as noted on page 303 of the Draft EIR. These Conditions of Approval require the completion of an environmental investigation and remedial action prior to the initiation of ground-disturbing activities within the project site. Implementation of the Conditions of Approval would ensure that EBMUD workers or other construction personnel would not face health risks from soil or groundwater contamination during the installation of water or sewer lines. Data on soil and groundwater contamination with the Project site will be submitted to EBMUD prior to the installation of utility lines.

Response A4-3: The comment states that the Draft EIR mischaracterizes EBMUD's utilization of its available treatment capacity and recommends deletion of text to correct the error. The comment also notes that the City and EMBUD have agreed to design and construct wet weather conveyance and treatment facilities to accommodate the wastewater flows set forth in the City's Infiltration/Inflow (I/I) Correction Program. The comments are noted and the City agrees to make the recommended change. The comments and the recommended change to the text do not alter the analysis or conclusions of the Draft EIR. The second paragraph on page 325 of the Draft EIR is revised as follows:

Wastewater generated by the Measure DD Implementation Project components represents less than 0.1 percent of the MWWTP's secondary treatment capacity. ~~This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater processed by EBMUD's Main Wastewater Treatment Plant.~~ EBMUD has sufficient capacity to treat wastewater flows from the projects during dry weather[19] and would not require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

Response A4-4: EBMUD requests that the City include water conservation measures in its Conditions of Approval for the project in accordance with the Landscape Water Conservation Section of the City's Municipal Code and that the City meet with EBMUD to discuss water conservation programs and best management practices. The comment is noted and will be considered by the City of Oakland decision-makers during review of the merits of the project.

Letter
A5

East Bay Regional Park District

2950 PERALTA OAKS COURT P.O. BOX 5381 OAKLAND CALIFORNIA 94605-0381 T. 510 635 0135 F. 510 569 4319 TDD. 510 633 0460 WWW.EBPARKS.ORG

September 5, 2007

City of Oakland
CEDA Planning Division
Attn: Elois A. Thornton
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: EAST BAY REGIONAL PARK DISTRICT COMMENTS ON THE DEIR PREPARED FOR THE MEASURE DD IMPLEMENTATION PROJECT

Dear Ms. Thornton:

Thank you for providing East Bay Regional Park District with a copy of the Draft Environmental Impact Report for the Measure DD Implementation Project. The District currently maintains and operates Martin Luther King Jr. Regional Shoreline where a segment of the San Francisco (SF) Bay Trail spans from just south of the Hanson Aggregate property to 66th Avenue. Currently under construction at the northern portion of the Shoreline, between East Creek Point and the Hanson Aggregate property, is an improved segment of the Bay Trail, landscaping, picnic areas, a wildlife observation/fishing pier, a service yard, paved entry road, parking lot and other appurtenant facilities necessary to serve these improvements. A portion of this area will be leased by the Oakland Strokes rowing club for the construction and operation of new boating and security facilities for the club.

The District has identified as a priority in its adopted Master Plan the completion of missing sections of the SF Bay Trail and is pleased that the "Waterfront Trail and Access Improvements" (Group 2) component of the Measure DD implementation project is intended to connect Martin Luther King Jr. Regional Shoreline to Estuary Park and Jack London square via the SF Bay Trail. With more than 1,000 miles of trail within Alameda and Contra Costa County, the District has extensive knowledge and expertise in trail design, maintenance and operation. Recognizing the District's interest in the successful completion of Oakland's waterfront trail and the project's compatibility with the District's existing facilities at Martin Luther King Jr. Regional Shoreline and plans for expansion of the SF Bay Trail, the District believes a coordinated effort between the City and the District is essential for the success of the project. From reviewing the project description in the DEIR, it appears that details are yet to be worked out for the final trail design, alignment, and trail maintenance/

1

Board of Directors

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Beverly Lane, Ward 6
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Nancy Skinner, Ward 1
Pat O'Brien, General Manager

Letter
A5
cont.

operation. The District requests that the City coordinate these details with the District as the project proceeds to design stages of development. The District's comments on the DEIR are related to these concerns and are as follows: **1 cont.**

Trail Design Specifications:

The DEIR does not provide sufficient detail for the design of the proposed trails to determine compatibility with existing segments of the Bay Trail (DEIR, P-52). In the absence of detailed design specifications for each new segment of trail, there could be a potential design conflict between the proposed future trails and their connections with existing trails. Acknowledging that these details cannot necessarily be worked out in the DEIR, to avoid this potential conflict, the District recommends that the City set forth design standards in the DEIR that will ensure trail design compatibility with existing trail specifications of the District and Bay Trail. The DEIR acknowledges that intergovernmental coordination for open space planning with East Bay Regional Park District is an adopted policy under the City's Open Space, Conservation and Recreation (OSCAR) General Plan Element (OSCAR, Policy OS-6.1). The District's trail details and Bay Trail Design Guidelines would be appropriate design standards to reference to ensure the compatibility of the future trail with existing trails. Coordination with the District on the final design of these trail segments will also ensure compatibility of the new segments of trail with existing trails. To facilitate this coordination, the City should engage the District early in the trail development and design process and submit plans for review by the District prior to commencing construction. **2**

Continuous Bay Trail:

Acquisition of land and construction of trail segments to complete the SF Bay Trail along the Oakland Estuary and establishment of a continuous waterfront parkway are identified as project objectives (DEIR page 25). Figures III-10a and III-10b which are meant to show the project area for waterfront trail and access improvements (Group 2 projects), do not show a continuous path resulting from completion of the project. Specifically, there appears to be gaps between:

1) Livingston Pier to the Cryer Site;
2) Park Street Bridge to Derby Avenue;
3) US Audio/Capture Technologies to High Street Bridge;
4) Gallagher & Burk/Hanson Aggregate to East Creek point.

3

In order to demonstrate that the project is consistent with the project objectives, the EIR should include a graphical exhibit / map that shows how the project will result in a continuous waterfront parkway. The graphic should provide sufficient detail to inform the public of thetype of trail (Class I, II or III) and note whether it is existing or part of the proposed project. Known gaps in the trail should be identified so as to not confuse the public as to where future segments of the Bay Trail are still missing.

Letter
A5
cont.

Hanson Aggregate Interim Connection:

The District currently operates and maintains the segment of the SF Bay Trail located south of the Hanson Aggregate property to 66th Avenue / Martin Luther King Jr. Regional Shoreline and previously commented on the Notice of Preparation for the project that it was exploring the possibility of a non-motorized bicycle and pedestrian route connecting the Bay Trail to High Street via Tidewater Avenue. The District is still exploring this as an option for the interim alignment of the SF Bay Trail.

The District supports Oakland's efforts in continuing the Bay Trail along the shoreline at the Gallagher & Burk/Hanson Aggregate trail segment. Recognizing this alignment may not be feasible in the short term, the District would like to see the Tidewater Avenue alignment considered as an interim route for the continuation of the SF Bay Trail northward as briefly mentioned in the project description (DEIR p. 57) and alternatives analysis (DEIR p. 359) of the DEIR. The final alignment for this trail segment will require a trail configuration which does not adversely affect operations of the Gallagher & Burk/Hanson Aggregate facility. **4**

Trail Maintenance:

Expansion of trails and enhancement of facilities will result in more intense use by the public versus pre-project conditions even though the project will not directly cause an increase in population. Trail user safety issues arising from poorly maintained trails are foreseeable indirect impacts of the park/trail expansion and should be a factor in evaluating applicable policies adopted by the City for ensuring that parks are adequately maintained for the safety of its users. Foreseeable hazards may include the presence of loose gravel & fallen debris; cracks; potholes; rough surfaces; flooding/drainage issues; lifting/sinking of trail surfaces; overgrown vegetation constraining the width of the trail & obstructing site visibility; and vandalized/broken bollards & security gates/fencing allowing for vehicular access to the trail.

The City's Open Space Conservation and Recreation (OSCAR) element of the General Plan identifies policies and action items that, if implemented, would ensure that parklands/trails are properly maintained. Implementation of these policies and action items would ensure that the new park/trail improvements will not deteriorate over the life of the project and pose a safety hazard to users. The City has adopted the following policies for the purpose of ensuring public safety for users of the Parks/Trail facilities, and for this reason, the District believes are relevant in the DEIR's analysis of applicable policies: **5**

1. Action REC-1.5.1: Adoption of a citywide park plan (OSCAR p. 4-32) - *A Parks and Recreation Master Plan is needed to guide decisions regarding the delivery of services and programs, and the expenditure of funds for operations, maintenance, and capital improvements.*

2. Policy REC – 4.1: Systematic Maintenance Provisions (OSCAR p. 4-46) - *Provide for ongoing, systematic maintenance of all parks and recreational facilities to prevent*

Letter
A5
cont.

deterioration, ensure public safety, and permit continued public use and enjoyment. Routine maintenance needs should be evaluated on a regular basis. Parks which receive very heavy use should receive more frequent maintenance than those with lesser use.

3. Action REC-4.1.1: Priority on maintenance - *Establish an annual budgeting process within the Office of Parks and Recreation which assigns a very high priority to park maintenance.*

4. Action REC-4.1.2: Improvements which reduce maintenance costs - *Undertake improvements and upgrades at Oakland parks which reduce annual maintenance costs. Physical hazards arising on trails and park facilities are typically a result of deferred maintenance which is directly tied to City funding/resource allocation.*

5 cont.

The above policies, if properly implemented, would address any indirect physical change in the environment that may occur from the project with respect to trail hazards resulting from deferred maintenance of the proposed improvements. The DEIR should give the status of the implementation of these policies/actions and using these policies, provide for long-term funding for maintenance of the trails to avoid potential hazards to trail users. This will help the DEIR provide information to the public to enable it to understand and evaluate potential indirect environmental impacts associated with insufficient levels of service for maintenance of the new facilities.

The District is pleased that the City of Oakland shares in its vision to close the gaps in the SF Bay Trail along the Oakland shoreline and looks forward to working cooperatively with the City on making this project a success. Thank you for the opportunity to review and comment on the DEIR and the City's consideration of the District's comments. If you have any questions or comments, please contact me at (510) 544-2627.

6

Sincerely,

Chris Barton
Senior Planner
Environmental Review/GIS Department

cc: Brad Olson, Environmental Programs Manager
Jim Townsend, Trails Program Development Manager

Letter A5
East Bay Regional Park District
Chris Barton, Senior Planner
September 5, 2007

Response A5-1: This introductory statement to the Park District's comment letter identifies the District's interest in the proposed Waterfront Trail component of the Measure DD Implementation Project. The Park District requests that the City coordinate these details with the District as the project proceeds to design stages of development. The comment is noted.

Response A5-2: The comment requests that the District's trail details and Bay Trail Design Guidelines be used as design standards to ensure compatibility of the future trail with existing trails. The comment also notes that the City has an adopted policy in its Open Space, Conservation and Recreation (OSCAR) General Plan Element that encourages intergovernmental coordination for open space planning with the Park District. The comments regarding design criteria and intergovernmental coordination do not address the Draft EIR's environmental analysis or identify a new impact of the project. These comments will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A5-3: As the comment notes, the purpose of the figures is to show the project area for the Waterfront Trail Group of the Measure DD Implementation Project. The "gaps" between the project areas are either complete or will be completed by others. The segment of trail between the Lake Merritt Channel and the 10th Avenue Marina is the only incomplete portion of the trail outside of the project area. It will be completed as part of the Oak to 9th Project, as shown on Figure III-10a. The trail is already complete at the other locations cited by the comment, that is, from the Livingston Pier to the Cryer Site, from the Park Street Bridge to Derby Avenue, from U.S. Audio Technologies to High Street and from the Gallagher & Burk/Hanson Aggregate property to 66th Avenue. The text of the Draft EIR is revised to clarify the status of the various segments of the Waterfront Trail outside of the limits for the Measure DD Implementation Project. Figures III-10a and III-10b are revised as shown on the following pages. The text on page 52 of the Draft EIR is revised as follows:

a. General Trail Characteristics. Most of the 6.6 miles of trail would be paved with asphalt or concrete, with minimal grading so as to minimize disturbance of the ground surface. At some locations, invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. Some portions of the existing Bay Trail between Jack London Square and 66th Avenue may be repaired to fix broken pavement, lighting, or signage. The trail would vary from a minimum 12-foot-wide combined use trail where space is constrained to a pair of bike and pedestrian signage would be installed along the trail.

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LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

SEGMENT OF WATERFRONT TRAIL THAT IS COMPLETE

FIGURE III-10a

Oakland Measure DD
Waterfront Trail North

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
I:\RAJ0606 measure dd\RTC\RTC Figures\Fig_III10a.ai (11/5/07)

LSA

N

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FEET

LEGEND

PROJECT AREA FOR WATERFRONT TRAIL GROUP

PORTION OF WATERFRONT TRAIL TO BE COMPLETED BY OTHERS

SEGMENT OF WATERFRONT TRAIL THAT IS COMPLETE

FIGURE III-10b

Oakland Measure DD
Waterfront Trail South

SOURCE: GOOGLE EARTH; LSA ASSOCIATES, INC., 2006
I:\RAJ0606 measure dd\RTC\RTC Figures\Fig_III10b.ai (11/5/07)

Some segments of the trail are already complete or will be completed as part of other projects. These segments include:

- Lake Merritt Channel to 10th Avenue Marina – segment will be completed as part of the Oak to 9th Project.
- Livingston Pier to Cryer Site – trail segment is complete
- Park Street Bridge to Derby Avenue – trail segment is complete
- U.S. Audio Technologies to High Street – trail segment is complete
- Gallagher & Burk/Hanson Aggregate to 66th Avenue Gateway – trail segment is complete, except for the northern-most portion

Response A5-4: The comment expresses support for completion of a portion of the Waterfront Trail in the vicinity of the Gallagher & Burk/Hanson Aggregate facility, either as described in the project description or, as an interim measure along Tidewater Avenue as described in the alternatives analysis. The comment is noted and will be considered by City of Oakland decision-makers during review of the merits of the project.

Response A5-5: Section B, Planning Policy, of the Draft EIR discusses how goals and policies from the City's General Plan are considered during the environmental review of the project. Goals related to recreation are presented in this section of the Draft EIR on page 93; relevant policies are presented in Appendix D.

The comment is correct in that the project would result in more intense use of trails by the public than the pre-project condition and that implementation of the City's policy for maintaining parks and recreational facilities would address any indirect physical change in the environment that may occur from the project with respect to trail hazards resulting from deferred maintenance. The project is not in conflict with this policy. Although the Measure DD funds would not be used for ongoing repair and maintenance, some funds would be used for renovating existing trails and other recreational facilities, which would reduce the need for maintenance in these areas over the short and mid-term. Future maintenance funds would be derived from the City's general fund and the Landscape Lighting and Assessment District.

As recommended by the comment, the text of the EIR is revised as follows to include the policy from the City's Open Space Conservation and Recreation (OSCAR) General Plan Element with regards to maintenance:

Policy Rec-4.1	**Systematic Maintenance Provisions.** Provide for ongoing, systematic maintenance of all parks and recreational facilities to prevent deterioration, ensure public safety, and permit continued public use and enjoyment. Routine maintenance needs should be evaluate on a regular basis. Parks which receive very heavy use should receive more frequent maintenance than those with less use.	*Lake Merritt and Lake Merritt Channel:* The project provides funding to renovate the Boathouse, Pergola, 18th Street Pie, which are consistent with the long-term upkeep of parks and recreational facilities. *Waterfront Trail:* The project provides funding to renovate existing trails as well as to construct new trails. *Recreational Facilities:* The project provides funding to renovate Studio One. *City-wide Creeks:* N.A.

Consistency with the many goals and policies in the City's General Plan will be considered by the City of Oakland decision-makers during review of the merits of the project.

Response A5-6: The comment states that the Park District supports the City's vision to close gaps in the Waterfront Trail. The District's support for this element of the project is appreciated and will be considered by City of Oakland decision-makers during review of the merits of the project.

Letter
A6

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

September 10, 2007

Ms. Elois A. Thornton
City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

ALA000223
SCH#2006122048

Dear Ms. Thornton:

Case No. ER 06-0017: Measure DD Implementation Project – Draft Environmental Impact Report

Thank you for continuing to include the California Department of Transportation (Department) in the environmental review for the proposed project. The comments presented below are based on the Draft Environmental Impact Report (DEIR) for the project referenced above. 1

The Department on behalf of Union Pacific Railroad is proposing to relocate one of the existing railroad bridges over the Lake Merritt Channel. This relocation is proposed to replace the rail capacity that will be impacted by a proposed nearby freeway project.

Traffic Impact Analysis

The document did not include a Traffic Impact Analysis or supporting technical documentation for project trips; thus we are unable to verify traffic conditions discussed in the DEIR. It is unclear how much traffic would be generated or distributed, and to which streets, and how much this traffic would contribute to the cumulative impact. The reconfiguration of local streets has significant impacts to ramp intersections regardless of trip generation. 2

We are concerned about the designation as "significant and unavoidable" for the impacts of Group 1 (Pages 137, 138, Impacts TRANS-5 through TRANS-9). The intersections named are either ramp intersections or adjacent intersections. The cost to widen these intersections and/or acquire right-of-way (ROW) should be considered since there are other significant projects included in the "cumulative plus project conditions" that should also be able to contribute fair share funds to mitigate these impacts. 3

Given the significant impact at the 7th Street and Oak Street intersection, we are also concerned about the ramp intersections at 6th Street and 5th Street. The impact to these intersections should be analyzed. 4

Letter
A6
cont.

The proposed sports complex will be located adjacent to Interstate 880 and the 98th Avenue interchange; what is the impact to the ramps and intersections? **5**

Cultural Resources

The Cultural Resources section in the DEIR is well done and satisfies environmental compliance for cultural resources within state ROW. However, if construction activities take place within State ROW during this project and there is an inadvertent archaeological discovery, the Department's Office of Cultural Resource Studies shall be immediately contacted at (510) 286-5618. A staff archaeologist will evaluate the finds within one business day after contact. **6**

Encroachment Permit

Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: Michael Condie, Mail Stop #5E. **7**

Should you have any questions regarding this letter, please call Lisa Carboni at (510) 622-5491.

Sincerely,

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: State Clearinghouse

Letter A6
California Department of Transportation (Caltrans)
Timothy Sable, District Branch Chief
September 10, 2007

Response A6-1: The comment regarding the California Department of Transportation's (Caltrans) proposed replacement of the Union Pacific Railroad (UPRR) bridges over the Lake Merritt Channel as part of a proposed nearby freeway project does not raise a specific issue regarding the environmental analysis in the Draft EIR so no further response is provided.

Response A6-2: The comment states that the document did not include a Traffic Impact Analysis or supporting technical documentation for project trips. Only the Recreational Facilities (Group 3) element of the project would generate automobile travel in the traditional sense. Trip generation for Group 3 is shown in Table IV.C-9 on page 143 of the DEIR. The number of auto trips for Group 3 was calculated for AM and PM peak weekday conditions and for Saturday peak conditions. Because of the characteristics of Group 1 and Group 2 elements of the project, no analysis of trip generation was required to provide a traffic impact analysis.

The Lake Merritt and Lake Merritt Channel (Group 1) element of the proposed project would affect transportation systems as a result of the changes proposed in travel lanes and roadway geometry around Lake Merritt. Group 1 was evaluated by comparing the results produced by the Alameda Countywide Travel Demand Model for the existing roadway configuration against the proposed changes in the roadway configuration. No-project traffic volumes were modified to account for the changes in traffic patterns predicted by the travel demand model. A quantitative traffic impact analysis resulting from the changes in traffic patterns associated with Group 1 components is documented in the Draft EIR on pages 122 through 140.

The Oakland Waterfront Trail and Access (Group 2) would close gaps along the San Francisco Bay Trail between Jack London Square and 66th Avenue in East Oakland and would not affect traffic operations on other transportation systems. Group 2 is not expected to change automobile travel demand but required the assessment of potential impacts on transportation systems where the trail may cross existing streets. A qualitative evaluation of Group 2 impacts was documented on pages 140 to 141.

In response to the comment that it is unclear how much traffic would contribute to the cumulative impact, all traffic volumes for cumulative conditions with and without the Group 1 element of the project are documented in Appendix E and the contribution to the cumulative impact is provided on pages 133 through 140.

In response to the comment that the reconfiguration of local streets has significant impacts to ramp intersections regardless of trip generation, the impacts of the Group 1 element of the project on ramp intersections was disclosed by the analysis of the following intersections, which are all connected to I-580 ramps:

- Santa Clara Avenue / Grand Avenue
- Macarthur Boulevard / Grand Avenue
- Lake Park Avenue / Lakeshore Avenue
- Macarthur Boulevard / Lakeshore Avenue

The traffic analysis in the Draft EIR concluded that traffic shifts caused by the proposed project would not significantly affect other freeway ramps.

Response A6-3: The comment incorrectly states that Impacts TRANS-5 through TRANS-9 were found to be significant and unavoidable. Impacts TRANS-5 through TRANS-7 were found to be significant and unavoidable; Impacts TRANS-8 and TRANS-9 were found to be significant but can be reduced to less-than-significant levels with the recommended mitigation measures. The comment states that the City should consider obtaining fair share funds from other projects that contribute to the impacts. The City is aware that other projects contribute to the impacts at the intersections and will pursue all appropriate methods of funding. The source(s) of project funding does not fall under the purview of CEQA and is not within the purview of this response document.

Response A6-4: Although the comment expresses concern that ramp intersections at 6th and 5th Streets (at I-880) might be significantly impacted, the analysis showed that traffic volumes on 7th Street south of Oak Street would not be affected (as shown by comparing the traffic volumes shown in Appendix E – Figures A.3 and A.4).

Response A6-5: In response to the question about the impact of the proposed sports complex to the ramps and intersections near I-880, the analysis was performed at a program level using the methods appropriate for a CMP analysis, as stated on page 143 of the Draft EIR. Roadway links on I-880 and local streets were evaluated and impacts were found to be less than significant. No intersection or ramp analysis was performed. The Draft EIR disclosed that I-880 would operate at LOS F during the peak hour but that the addition of sports complex traffic would not be significant. Similarly, the link level of analysis found that the sports complex would not have significant impacts on local streets.

Response A6-6: The comment provides contact information for Caltrans' Office of Cultural Resources in the event there is an archaeological discovery within State right of way during Measure DD Implementation Project construction activities. The City appreciates the contact information and will notify Caltrans as required when working within State right of way.

Response A6-7: The City will obtain necessary encroachment permits from Caltrans and appreciates the information describing Caltrans resources that are available to assist with the permit process.

Letter
A7

STATE OF CALIFORNIA — Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

August 31, 2007

Elois Thornton
City of Oakland
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

RE: Measure DD Implementation Project, SCH# 2006122048

Dear Ms. Thornton:

There are some very serious problems that do need to be addressed regarding bicycle and pedestrian circulation in the vicinity of Lake Merritt channel near the UP tracks. The DEIR suggests that an at-grade crossing may be one alternative, however, UP and CPUC staff would adamantly oppose an at-grade crossing. Without a grade separated crossing near the channel, pedestrians and cyclists will most likely use the 5th Avenue at-grade railroad crossing, which is not designed to accommodate non-motorists, and even with significant upgrades would still be a hazardous location for pedestrian and bicycle traffic. **1**

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Terrel Anderson, Union Pacific Railroad

Letter A7
California Public Utilities Commission (PUC)
Kevin Boles, Environmental Specialist
August 31, 2007

Response A7-1: The comment states that the California Public Utilities Commission and the Union Pacific Railroad (UPRR) oppose an at-grade crossing of the UPRR tracks in the vicinity of the Lake Merritt Channel and that without a grade separated crossing at this location, pedestrians and cyclists would likely use the 5th Avenue crossing. The comment claims that the 5th Avenue crossing is hazardous and suggests a grade separated crossing near the channel or safety improvements at the 5th Avenue crossing. The proposed bicycle and pedestrian connections between I-880 and the Oakland Estuary are not part of the proposed project and no at-grade crossing in the vicinity of the Lake Merritt Channel is proposed. Streetscape improvements to 5th Avenue, not part of the Measure DD project, are in the initial planning stage, and could potentially include safety improvements at the existing at-grade crossing.

The trail along the Lake Merritt Channel currently ends south of the 7th Street Bridge and this would not change as part of the project. On the east side of the Channel the trail merges into the parking lot south of the Peralta College District offices; on the west side of the Channel, the trail passes under I-880 and connects to the dead end of 4th Street. Bicycle and pedestrian access to the estuary from the Downtown and Lake Merritt areas of Oakland would continue to be served by 5th Avenue, Oak Street (currently a bike route, Class 3), or other connections in the vicinity of Jack London Square. Both 5th Avenue and Oak Street are identified as proposed bike lanes (Class 2) in the City's proposed 2007 Bicycle Master Plan. The rail line crossings at these locations currently include safety features (i.e., automatic gates and flashing signals) and further improvements to the crossings (e.g., striped lanes and signage) would be included as part of other projects to upgrade these bicycle connections.

The Draft EIR acknowledges that several issues would need to be resolved before a crossing of the railroad tracks along the Lake Merritt Channel is implemented, including agreements with UPRR and the Public Utilities Commission. The resolution of improving trail connectivity in this area is not part of the Measure DD Implementation Project, as noted on page 129 of the Draft EIR. Completion of the trail connection along the channel would likely require subsequent environmental review once a project is defined. The City will work with UPRR and the Public Utilities Commission to ensure the safety of pedestrians and bicyclists should a new crossing of the UPRR tracks be proposed.

To clarify where the trail would end south of 7th Street, the text on pp. 35-36 of the Draft EIR is revised as follows:

As part of the Measure DD Implementation Project, the City proposes to widen the Channel, streambed, stream banks and upland areas between Lake Merritt and the Estuary by removing the 10th Street culvert and 12th Street culvert (discussed above) and grading the Channel's banks, thus creating additional areas of open water and tidal marsh as shown in Figure III-4. The bottom of the channel at 12th Street would be lowered. Shoreline improvements (e.g., pedestrian pathways and tidal marsh) along the channel between 12th Street and I-880 would be similar in design to those ~~to the designs~~ proposed for the 12th Street project component. The existing pedestrian bridge below 10th Street would be refurbished or replaced. At 7th Street, the pedestrian tunnel on the east side of the trail would be refurbished and the pedestrian tunnel on the west side would be relocated to allow construction of the new bypass channel. A new traffic signal and crosswalk across 7th Street is proposed. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. The trail south of 7th Street would be refurbished but would otherwise remain unchanged. On the east side of the Channel the trail merges into the parking lot south of Peralta College District offices; on the west, the trail passes under I-880 and connects to the dead end of 4th Street.

The City will ~~is proposing to~~ remove some existing trees (approximately 58) along the channel as shown in Figure III-5. Invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline and new intertidal and upland plantings consisting of native plants such as pickleweed (lower marsh areas), marsh gumplant, and salt grass (upper marsh areas and transitional zones characterized by native grasses), and shrubs and trees would be planted to restore the natural ecosystem of the Channel. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. The City also is proposing to install biofiltration basins to improve water quality. Typical construction activities would include clearing, grading, excavating, pile driving, and replanting of landscaping using various pieces of construction equipment and by hand labor. ~~This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt.~~

Letter
A8

From: Sulouff, David [David.H.Sulouff@uscg.mil]
Sent: Friday, September 07, 2007 1:38 PM
To: Thornton, Elois
Subject: MEASURE DD, LAKE MERRITT & PROPOSED BAY TRAIL

Ms. Thornton:

We completed our preliminary review of the DEIR for the subject project.
Proposed navigational impacts were not adequately addressed. When the applicant begins working with the Coast Guard for Bridge Permitting issues, the environmental document, as drafted, with be inadequate for our use. **1**

Attached is a .pdf of our previous correspondence on the topic.

Thank you,
David H. Sulouff
Chief, Bridge Admin
Eleventh Coast Guard District
Bldg 50-2 Coast Guard Island
Alameda, CA 94501
(510) 437-3516

Letter
A8
cont.

U.S. Department of Homeland Security
United States Coast Guard

Commander
District Eleven

U. S. Coast Guard Island, Bldg. 50-2
Alameda, CA 94501-5100
Staff Symbol: (dpw)
Phone: (510) 437-3516
Fax: (510) 437-5836

16590
Oak Inner Tidal Canal (5.6)
January 16, 2007

City of Oakland
Attn: Elois A. Thornton
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Madam:

Please include the Coast Guard Bridge Office concerning the Measure DD Environmental Impact Report (EIR) Project, for all bridge related issues over existing or proposed navigable waters of the United States. **2**

The General Bridge Act of 1946 requires that the location and plans for bridges over navigable waters of the United States be approved by the Commandant, U. S. Coast Guard prior to commencing construction. The Oakland Inner Tidal Canal and the Oakland-Alameda Estuary are considered to be navigable waterways of the United States for bridge administration purposes. Coast Guard Bridge permitting is subject to the National Environmental Policy Act. **3**

Lake Merritt and the portion of Lake Merritt Channel upstream from the impoundment are presently not considered navigable for bridge permitting purposes. However, alteration of the waterway to allow vessels to navigate between the lake and the estuary would result in a change to the determination and existing or proposed bridges would become subject to Coast Guard Jurisdiction. **4**

Applications for bridge permits should be addressed to Commander, Eleventh Coast Guard District, Bridge Section, Bldg 50-2, Coast Guard Island, Alameda, CA 94501. Applications are available on-line at: http://www.uscg.mil/hq/g-o/g-opt/g-opt.htm. The application must be supported by sufficient information to permit a thorough assessment of the impact of the bridges and their immediate approaches on navigation and the environment. We recommend discussing the proposed impacts of procedures for constructing, altering or demolishing bridges. The Environmental Impact Statement should also contain data on the number, size and types of vessels using or projected to use the waterway. **5**

We appreciate the opportunity to comment on the project in this early stage. I can be contacted by telephone at (510) 437-3516 if additional information is needed.

Sincerely,

David H. Sulouff
Chief, Bridge Section
Eleventh Coast Guard District
By direction of the District Commander

Copy: San Francisco Corps of Engineers
CG Sector, San Francisco

Letter A8
United States Coast Guard
David H. Sulouff, Chief, Bridge Section
September 7, 2007

Response A8-1: The City considered the project's design features and the operation of the bridges when determining whether the project would create a safety hazard or impede marine transportation. As noted on page 56 of the Draft EIR, to the extent feasible, the undercrossings of bridges along the Waterfront Trail would not extend beyond the existing pierhead line. The trail would remain as close to the existing bridge abutments as possible to ensure public safety and not impede navigation. Further, the bridge undercrossings would not impede marine transportation or create a significant safety hazard because to allow passage of marine vessels at High and Park streets, both the north and south ends of the bridges are raised, with marine vessels passing through the opening near the midpoint of the Tidal Canal. At Fruitvale Avenue, the south end (Alameda side) of the bridge is raised, with marine vessels passing through the opening south of the midpoint of the Tidal Canal. The proposed trail undercrossing would be beneath the fixed northern section (Oakland side) of the Fruitvale Bridge, which remains lowered during vessel passages. Thus, the City concludes that the proposed design of the bridge undercrossings would allow adequate room for the passage of marine vessels and would not create a safety hazard for pedestrians and bicyclists or impede marine shipping. See Photoplate 1 on the following page, which show the bridges in the open position during the passage of marine vessels.

However, the City recognizes that the U.S. Coast Guard and the shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail, particularly at the High Street and Park Street bridges, and that the U.S. Coast Guard has permitting authority in this area. For this reason, and others, the City proposes to pull the proposed boardwalk closer to the shore at the High Street and Park Street bridges, so that the channel is not narrowed any further. Also the City proposes an alternative to the project that does not include the passage of the Waterfront Trail beneath the bridges. That alternative is described and analyzed in Section V.F of the Draft EIR (pp. 356-359).

To clarify the City's conclusions regarding safety and shipping in the Oakland Channel the text on page 142 of the Draft EIR is revised as follows:

Traffic <u>and Maritime</u> Hazards. Implementation of the proposed project would result in the Bay Trail passing under the bridges. Therefore, the project would not result in any significant impacts related to traffic hazards as the trail would not conflict with vehicular circulation. <u>To the extent feasible the proposed trail segments that would pass beneath the Park Street and High Street bridges would not extend further into the channel than the existing bridge fenders. At all bridges, trail segments would be kept as close to the shoreline as necessary to ensure public safety and not impede</u>

Photoplate 1: Barge Passage along the Oakland Inner Harbor Tidal Canal

Alameda side — Park Street Bridge — Oakland side

Oakland side — Fruitvale Bridge — Alameda side

Alameda side — High Street Bridge — Oakland side

navigation. However, the U.S. Coast Guard and others have raised concerns about the potential safety and feasibility of a trail being constructed under the bridges, particularly the High Street and Park Street bridges. Recognizing that the U.S. Coast Guard has permitting authority in these areas, the City includes street-level crossings in these areas as part of the alternative for the Waterfront Trail Group, described in Section V.F, Waterfront Trail Surface Street Connection Alternative.

The comment also resubmits comments made when the Notice of Preparation was issued. While these comments are not specific to the Draft EIR, as they were submitted in advance of its publication, they are nevertheless addressed by Responses to Comments A8-2 through A8-5.

Response A8-2: Copies of the Draft EIR and the Notice of Availability were sent to Mr. Sulouff as part of the noticing process for the EIR. Refer also to Response to Comment B4-1.

Response A8-3: The comment regarding the permitting authority of the U.S. Coast Guard is noted. The City understands that the U.S. Coast Guard must comply with the requirements of the National Environmental Policy Act (NEPA) and will work with the U.S. Coast Guard to prepare the required documentation, as needed.

Response A8-4: The comment regarding the effect of the proposed action on the U.S. Coast Guard's jurisdiction over areas upstream of 7th Street is noted. As the comment does not relate to the environmental analysis within the Draft EIR so no further response is provided.

Response A8-5: The City appreciates the information provided in the comment for obtaining and completing U.S. Coast Guard bridge permit applications and the contents of the permit application and supporting NEPA documentation. The City will prepare the required applications and work with the U.S. Coast Guard to prepare NEPA documentation, as needed.

B. ORGANIZATIONS AND INDIVIDUALS

Letter
B1

Golden Gate Audubon Society
2530 San Pablo Avenue, Suite G • Berkeley, California 94702
Phone: (510) 843-2222 • Fax: (510) 843-5351 • Email: ggas@compuserve.com
Americans Committed to Conservation • A Chapter of the National Audubon Society

September 7, 2007

Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Pl., Ste. 3315
Oakland, CA 94612

Re: Measure DD Project DEIR (Case No. ER 06-0017)

Dear Ms. Thornton:

This letter sets forth the comments of the Golden Gate Audubon Society (GGAS) on the above-referenced Draft Environmental Impact Report (DEIR). The (GGAS is an environmental advocacy organization with members both in Oakland as well as throughout the larger Bay Area. One of the GGAS's principal purposes is the protection and enhancement of wildlife habitat for avian species, particularly migratory waterfowl.

The Lake Merritt/Lake Merritt Channel complex supports migratory waterfowl habitat of regional significance. The project that the City proposes to carry out with the support of Measure DD funding will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. Accordingly, as we stated in our letter dated January 4, 2007 (a copy of which is reproduced in Appendix C of the DEIR), which we submitted in response to the NOP for this environmental review, the GGAS is in general strongly supportive of the projects described in the DEIR.

In the GGAS's letter in response to the NOP, we identified two respects in which the projects described in the DEIR have the potential to degrade or otherwise have an adverse impact on the regionally significant waterfowl habitat that the Lake Merritt Channel (LMC) supports: 1) noise, movement of heavy construction equipment, and other construction-related disturbances associated with the implementation of proposed improvements at the 7th, 10th and 12th street crossings of the LMC, and 2) disturbance associated with the opening of the LMC to small boat traffic. We called upon the City to carefully evaluate these potential impacts and develop appropriate mitigation measures to minimize them. **1**

We are pleased to see that in § IV.F.2.c(4) (p. 217) the DEIR proposes a mitigation measure (Impact BIO-4 (Group 1)) in the form a seasonal closure of the LMC to small boat traffic in order to minimize the adverse effects on the LMC's wildlife habitat that such traffic might otherwise cause. We recommend that the measure be clarified by specifying that the "small boat use" of the LMC that would be allowed **2**

Letter
B1
cont.

during the non-migratory season is limited to nonmotorized use. With this clarification, we fully concur in this measure. **2 cont.**

However, we disagree with the reasons that the DEIR gives for its conclusion that construction-related impacts on the LMC's wildlife habitat are "less than significant." The DEIR correctly acknowledges that "construction activities at the LMC (e.g., grading, demolition of existing culverts, tree removal) during [the period when waterbirds are most abundant (approximately October through March)] would disturb waterbirds by causing them to fly away…." The DEIR further acknowledges that such disturbance "negatively affects wintering ducks by causing the expenditure of energy…that would otherwise be used for behaviors necessary for survival, such as resting or feeding." The DEIR's conclusion that such effects are "less-than-significant" because the affected wildlife can simply "relocate to nearby areas," is inconsistent not only with the DEIR's own analysis of the effects of human disturbance on waterfowl, but also with the "work window" for pile driving (Impact BIO-2 (Group 2)) that the DEIR recommends to avoid the adverse impacts that such activity would otherwise have on fish habitat in the Oakland Estuary. At least in the absence of evidence that adoption of one or more similar "work windows" for the Measure DD-funded projects in or adjacent to the LMC is infeasible, the GGAS believes that adoption of such measures is called for. **3**

Thank you for your consideration of these comments. Please send future notices to the GGAS in care of me at my home address: 1433 Hampel St., Oakland, 94602.

Sincerely,

John Bowers

John Bowers
Member, East Bay Conservation Committee

LETTER B1
Golden Gate Audubon Society
John Bowers, Member, East Bay Conservation Committee
September 7, 2007

Response B1-1: This introductory statement expresses an opinion on the merits of the project and notes that the project will in general enhance the natural resource and habitat values of the Lake Merritt aquatic system. The Society's support for these elements will be considered by City of Oakland decision-makers during review of the merits of the project. The comment also identifies issues raised in the Society's comments on the Notice of Preparation. Refer to Responses to Comments B1-2 and B1-3.

Response B1-2: The comment recommends restricting small boat use of the Lake Merritt Channel to non-motorized vessels during the non-migratory season. As this restriction is not required to mitigate a significant effect of the project the measure is not included as mitigation. However, the Society's recommendation will be considered by City decision-makers during review of the merits of the project.

Response B1-3: The Draft EIR's analysis of impacts is consistent. When determining whether the project would have an adverse effect on wildlife species, the City considered both the intensity and duration of the project activity. In the case of migratory fish that may be present in the Oakland Estuary, potential exposure to the percussive sound waves produced by pile driving, although brief, could injure or kill protected fish species. Thus, the risk of injury or death is high and mitigation is recommended. On the other hand, pile driving in the Lake Merritt Channel may temporarily displace migratory waterbirds to other nearby areas of suitable habitat but the birds are not at risk of being injured or killed by the activity. Thus, the Draft EIR did not find this to be a significant adverse effect.

Letter
B2

Oaks California Oak Foundation

Our mission is to protect and perpetuate native oak woodlands

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September 10, 2007

City of Oakland Planning Commission
Oakland City Hall
250 Frank Ogawa Plaza
Oakland, Ca 94612

Ladies and Gentlemen:

At a time when every tree matters in the fight against Global Warming, please consider carefully before you approve the Final EIR which will remove more than 250 trees from our City's Lake Merritt and the Lake Merritt Channel. **1**

Attached is a paper which fully describes the implications of existing trees for wildlife habitat. Also enclosed is a recent settlement in California Attorney General's challenge to urbanizing area to include Global Warming considerations in their planning. **2**

Thank you for your attention to this important matter.

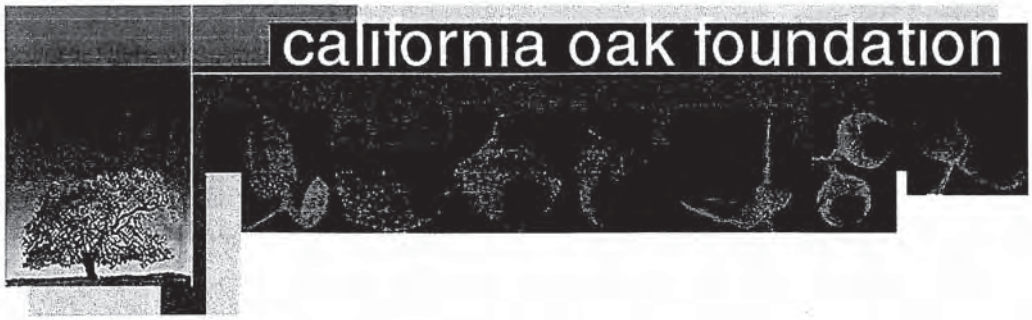
Sincerely,

Janet Santos Cobb, President

Enclosures

1212 BROADWAY, SUITE 842 OAKLAND CA 94612 TEL 510 763 0282 FAX 510 208 4435 OAKSTAFF@CALIFORNIAOAKS.ORG WWW.CALIFORNIAOAKS.ORG

Letter
B2
Attach A



September 2007

California Oak Report

Oaks & Climate Change

California Attorney General Edmund G. Brown, Jr. (AG) has reached a landmark lawsuit settlement with San Bernardino County involving the extent to which the County's environmental impact report for its General Plan update should address impacts on climate change. This is the first time any California jurisdiction has entered into a legally binding agreement to look at the overall impact of its planning on global warming.

The agreement solidifies climate change as an impact to be addressed in California Environmental Quality Act (CEQA) environmental review documents. Significant impacts to oak woodlands must be addressed in CEQA green house gas reviews because oak impacts uniquely combine carbon capture and carbon emission issues.

According to the AG, discretionary approvals must provide: (1) An examination of a project's impact on climate change and the adoption of all feasible mitigation measures to reduce such impacts, and (2) such analysis can – and must – be done today even absent established thresholds of significance or impending regulations under Assembly Bill 32. The state's California Climate Action Registry, which will guide AB 32 regulations, recognizes that converting oak woodlands to development is a carbon emission due to lost forest photosynthesis. Moreover, many municipal and county codes have general or specific tree-related provisions that reference air quality, air pollution or climatic conditions.

Consistent with the CEQA opinions of the AG, where significant oak resource impacts occur, project air quality analyses must consider three oak resource factors: (1) How much carbon is sequestered in the impacted oak trees?; (2) How much potential carbon sequestration will be lost due to oak seedling, sapling and tree impacts?; (3) How much sequestered carbon will be released if the impacted oaks are burned?

The CEQA Oak Woodlands Dilemma

The oak woodlands circumstances are unique for each CEQA project. Unfortunately, project oak woodland mitigation measures consistently fail to provide proportional habitat mitigation. The basic problem is a failure to see the forest for the trees, exemplified by the fact that invariably mitigated negative declarations and environmental impact reports biologically analyze oak woodlands but mitigate for individual oak trees.

<u>On-Site Conservation Easement Mitigation</u>

Impact avoidance through on-site oak woodlands conservation easement serves only to limit the degree of significant oak woodland impacts and the project applicant's oak woodlands mitigation responsibilities. An on-site oak preserve amounts to nothing more than a promise not to further remove or fragment the remnant oak resource; these preserves do nothing to proportionally mitigate for the actual impacts from removing project site oak habitat.

Placement of an oak woodlands easement within a development is of marginal habitat value and also creates a potentially hazardous fire condition. Residual or planted oaks are at great risk of future loss through new Cal Fire fuel reduction regulations and increasingly stringent fire insurance policy standards.

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Attach A

BIOLOGICAL CONSERVATION 132 (2006) 311–321

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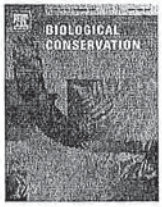

Scattered trees are keystone structures – Implications for conservation

Adrian D. Manning, Joern Fischer, David B. Lindenmayer*

Centre for Resource and Environmental Studies, The Australian National University, Building 43, Biology Place ANU, Canberra, ACT 0200, Australia

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Wood-pasture

ABSTRACT

Scattered trees are prominent features in many landscapes worldwide, including natural landscapes, cultural landscapes, and recently modified landscapes. The ecological importance of scattered trees is widely acknowledged in natural landscapes, but has not been sufficiently appreciated in human-modified landscapes. This paper shows that scattered trees are keystone structures in a wide range of landscapes. At the local scale, ecological functions of scattered trees include: provision of a distinct microclimate; increased soil nutrients; increased plant species richness; increased structural complexity; and habitat for animals. At the landscape scale, ecological roles include: increased landscape-scale tree cover; increased connectivity for animals; increased genetic connectivity for tree populations; and provision of genetic material and focal points for future large-scale ecosystem restoration. Furthermore, in disturbed landscapes, scattered trees often are biological legacies that provide ecological continuity through time. In combination, these ecological functions support the argument that scattered trees are keystone structures. That is, their contribution to ecosystem functioning is disproportionately large given the small area occupied and low biomass of any given tree, and the low density of scattered trees collectively. Because scattered trees fulfill unique functional roles in a wide range of scattered tree ecosystems, their loss may result in undesirable ecological regime shifts. A key management challenge in all landscapes with scattered trees is to maintain a balance between recruitment and mortality of trees in an appropriate spatial pattern. Meeting this challenge may represent an important step towards the genuine integration of conservation and production in human-modified landscapes.

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> *"The way things look is not always the way things are. This fact should be cause for consternation among those who are interested in the management of ecological systems. A highly functional landscape structure may go unnoticed - even by people who depend upon its function"* (Nassauer, 1992, p. 239).

1. Introduction

Ecosystems with scattered trees occur throughout the world. The origins and ecological roles of scattered trees in natural ecosystems have been intensively studied in many parts of the world, including in the Brazilian Cerrados (Furley, 1999),

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doi:10.1016/j.biocon.2006.04.023

Letter
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Attach A

Venezuelan Trachypogon savanna (San José et al., 1991), African savannas (Belsky, 1994), arid rangelands in South Australia (Facelli and Brock, 2000), oak savannas in North America (Nuzzo, 1986) and the forest-tundra transition zone of the boreal forest (Sirois, 1992). Scattered trees are also prominent features of many human-dominated landscapes, including recently cleared landscapes in Central America (Guevara et al., 1992), Africa (Duncan and Chapman, 1999) and temperate Australia (Ozolins et al., 2001), well-established cultural landscapes such as the dehesas in Spain and Portugal (Díaz et al., 1997) or British wood-pastures (Peterken, 1996), and severely disturbed forest landscapes (Gibbons and Lindenmayer, 2002). In this paper, these systems are collectively referred to as "scattered tree ecosystems". This definition is intended to be broader than that of "savanna" (sensu Bray, 1960), and includes natural, cultural and recently modified, as well as disturbed and undisturbed ecosystems (Fig. 1). The key defining feature of scattered tree ecosystems is the dispersed pattern of the trees. Scattered trees are referred to by various synonyms in different areas, including isolated trees (Dunn, 2000), pasture trees (Otero-Arnaiz et al., 1999), paddock trees (Law et al., 2000), and remnant trees (Guevara et al., 1986).

In this paper, scattered tree ecosystems are categorized into three groups for the purposes of discussion: (1) natural (such as savannas), (2) cultural (such as wood-pastures), and (3) recently modified (such as remnant paddock trees in south-eastern Australia) (Fig. 1). The distinction between cultural and recently modified scattered tree ecosystems is that the former have a long-term history of manipulation by humans and have been sustained by cultural systems over a long period of time. In contrast, the latter are recently modified, and often highly modified, and levels of tree cover are often declining. In reality, the distinction between the three categories will be blurred, and both natural and cultural scattered tree ecosystems can be highly modified. Similarly, levels of human modification and natural disturbance often interact, and scattered tree ecosystems therefore occur on a continuum from natural through to recently modified.

Despite large differences in climate and origin, scattered trees in natural, cultural and recently modified landscapes share many key ecological roles as well as several threats to their continued existence. However, especially in modified landscapes, the ecological value of scattered trees has rarely been recognized. The aims of this paper are to:

(1) demonstrate the keystone role of scattered trees;
(2) synthesize key ecological functions of scattered trees and highlight parallels between natural, cultural and recently modified ecosystems;
(3) establish common threats to scattered trees, especially in human-dominated landscapes; and
(4) outline ways in which scattered trees might serve as a landscape management tool to integrate conservation and production in human-modified landscapes.

By outlining the similarities between scattered trees in natural, cultural and recently modified ecosystems, this paper aims to facilitate increased recognition of the importance of scattered trees in modified landscapes. It is argued that native scattered trees exert a disproportionate effect on ecosystem function in a wide range of ecosystems, and that their loss therefore may lead to the deterioration of important ecosystem functions.

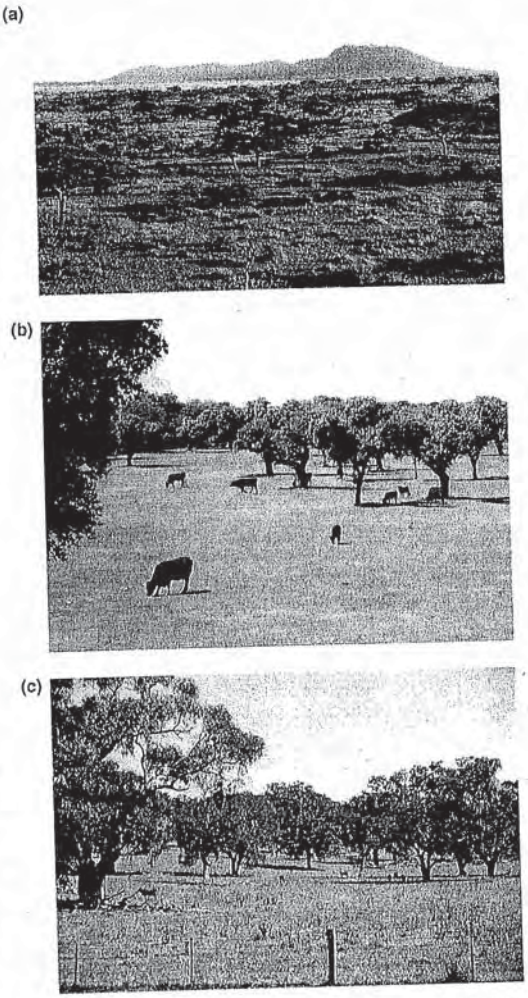

Fig. 1 – Three landscapes with scattered trees, representing a continuum of alteration states: (a) a natural landscape in southern Africa (top; photo by R. Heinsohn), (b) a cultural landscape in southern Spain (middle; photo by D. Gilmour, copyright IUCN), and (c) a recently modified landscape in south-eastern Australia (bottom; photo by A. Manning).

2. Scattered trees are keystone structures

A large amount of evidence demonstrates a wide range of important ecological functions of scattered trees in many natural, cultural, and recently modified landscapes (reviewed in detail below). In various different ecosystems, several authors

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Attach A

have independently noted the "keystone" role of scattered trees, for example, in the Negev desert in Israel (Munzbergova and Ward, 2002), and in dehesas in Spain (Plieninger et al., 2003). Tews et al. (2004a,b) considered scattered trees in African savannas as "keystone structures" because:

> *"[A] wide array of species groups (e.g. arthropods, birds or mammals) depend on [scattered] trees as a food resource, shelter or nesting site. Consequently, overall species diversity is strongly linked to the quality of this structure"* (Tews et al., 2004a, p. 87).

Given many parallel functions of scattered trees across a broad spectrum of vastly different ecosystems, native scattered trees should be recognized as keystone structures in a wide range of landscapes, including natural, cultural and recently modified landscapes. Furthermore, some traditional agroforestry systems using non-native and domesticated tree species can also have important ecological and socio-cultural values (see Herzog, 1998, regarding the European "Streuobst" agroforestry system where fruit trees are undersown with crops or managed grassland). Analogous to the keystone species concept (reviewed by Power et al., 1996), scattered trees are keystone structures because they have a disproportionate effect on the ecosystem relative to the small area occupied and low biomass of any given tree and the low density of scattered trees collectively. It is precisely because scattered trees are not part of a large consolidated patch, that their local and landscape effects are pronounced. In an ecosystem otherwise dominated by ground cover vegetation, a single scattered tree will add a raft of additional or enhanced functions (Fig. 2). In contrast, when part of an existing large patch of trees, the addition of a single tree is less likely to add new functions not already fulfilled by other existing trees.

To maintain functioning ecosystems, it is widely recognized that priority should be given to species that fulfill unique functional roles rather than functionally redundant species (Walker, 1992; Elmqvist et al., 2003). The raft of roles fulfilled by scattered trees suggests that the notion of functional uniqueness should be extended beyond species to include structural features, such as scattered trees. Given the lack of alternative features that could fulfill similar ecological functions to scattered trees, the ability of scattered tree ecosystems to maintain their essential characteristics directly depends on the ongoing existence of scattered trees. Scattered trees are threatened in many modified landscapes (see below). These threats, in combination with the functional uniqueness of scattered trees, suggest that many scattered tree ecosystems are in a precarious state (for example, British wood-pasture, Kirby et al., 1995). That is, their resilience to further disturbance is low, and they are at risk of undesirable regime shifts (for discussions of precariousness, resilience and regime shifts see Folke et al., 2004; Walker et al., 2004). In the following section, various ecological functions of scattered trees are outlined which support the argument that scattered trees are keystone structures.

3. Functions of scattered trees

In natural, cultural and recently-modified landscapes, scattered trees fulfill many functions. The following sections

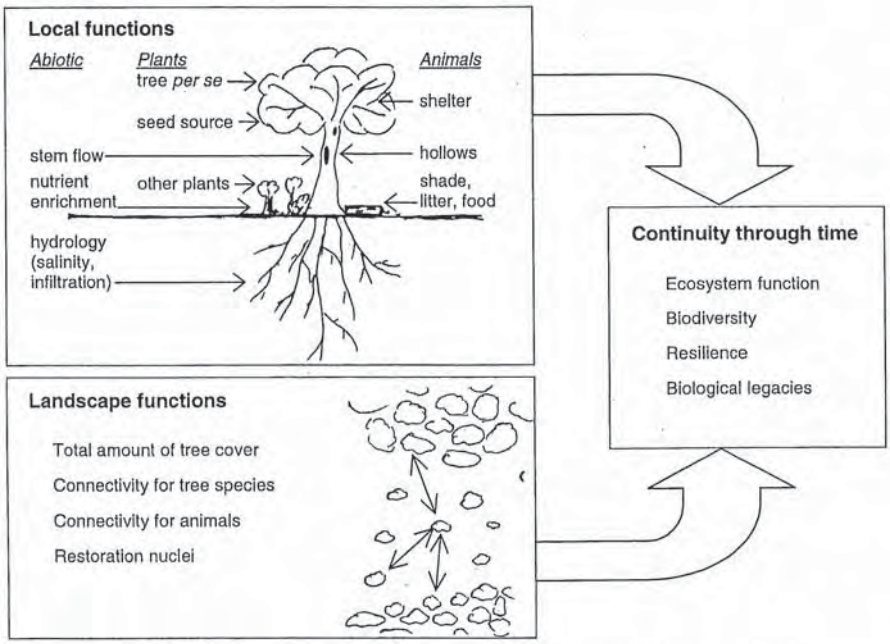

Fig. 2 – Schematic summary of some key ecological functions of scattered trees.

Table 1 – Examples of direct benefits from scattered trees to humans in modified landscapes

Benefit	References
Provision of ecosystem services (sensu Daily, 1997) which are essential for farming	This paper
Provision of fruit in many tropical landscapes	Aguilar and Condit (2001)
Wood products like firewood, fence posts and charcoal	Joffre et al. (1999), Pulido et al. (2001)
Shade and sheltered grazing for livestock	Kirby et al. (1995), Harvey and Haber (1999), Reid and Landsberg (1999), Quelch (2002)
Fodder for livestock in Britain	Peterken (1996)
Preservation of family traditions and real estate values in dehesas	Plieninger et al. (2004)
Recreational value for walkers and hunters in Scotland	Kirby et al. (1995), Quelch (2002)

consider: (1) the local-scale ecological functions of individual trees, (2) their role as biological legacies in modified landscapes, and (3) landscape-scale ecological functions of multiple scattered trees. In addition, examples of direct benefits from scattered trees to humans are given in Table 1.

3.1. *Local-scale ecological functions of scattered trees*

At the local scale, a given scattered tree influences its abiotic environment as well as plant and animal life (Fig. 2). Local changes to the abiotic environment are widely documented in natural, cultural and recently modified landscapes throughout the world, including the dehesas (Joffre et al., 1999), African savannas (Dean et al., 1999), and Australian rangelands (Facelli and Brock, 2000). Typical changes involve a cooler and often wetter microclimate under a given tree due to the interception of radiation and precipitation (Mistry, 2000). Stem flow, water uptake through the root system from below and around the tree, and increased infiltration of water into the soil further enhance the concentration of water near a given tree, especially in otherwise dry environments (Vetaas, 1992; Eldridge and Freudenberger, 2005).

Scattered trees also contribute to a local increase of nutrients, as demonstrated in dehesas (Joffre and Rambal, 1993), in south-eastern Australia (Wilson, 2002), the Brazilian Caatinga (Tiessen et al., 2003), and African savannas (Belsky, 1994). Nutrient levels under scattered trees are typically enhanced by litter accumulation, animal dung, the interception of nutrients by trees, and the accumulation of nutrients by tree roots (Wilson, 2002; Dean et al., 1999; Prober et al., 2002). Many scattered trees in dry savannas form symbiotic relationships with *Rhizobium* bacteria, thereby fixing atmospheric nitrogen and making it accessible to plants (Vetaas, 1992). By increasing the local water balance and nutrient concentration, scattered trees can enhance primary productivity (Ludwig et al., 1999).

Numerous benefits to plant life originate from scattered trees. The most basic benefit to plant diversity is the presence of scattered trees themselves. In recently modified ecosystems, scattered trees often represent samples of the original, pre-modification vegetation, and therefore provide important conservation opportunities in their own right (see Section 3.2). In central American modified landscapes, scattered trees are often represented by more than 50 species (Guevara et al., 1992; Harvey and Haber, 1999; Otero-Arnaiz et al., 1999; Aguilar and Condit, 2001), and in temperate Australia many scattered trees are the remnants of threatened vegetation communities like white box-yellow box-Blakely's red gum woodlands (*Eucalyptus albens/E. melliodora/E. blakelyi*; Gibbons and Boak, 2002). The conservation values of scattered trees per se also has been noted in the Brazilian Cerrados (Furley, 1999), the dehesas (Díaz et al., 1997), and British wood-pastures (Peterken, 1981, 1996; Kirby et al., 1995). Some scattered tree systems, such as dehesas, can have relatively few tree species (*Quercus ilex* and *Q. suber*), but still have high conservation value (Díaz et al., 1997).

Many other plant species typically benefit from the presence of scattered trees. For example, dehesas provide habitat for 30% of vascular plants in the Iberian peninsula (Pineda and Montalvo, 1995). Both in natural savanna landscapes (San José et al., 1991) and human-modified landscapes like in Central America (Guevara et al., 1992) or eastern Australia (Toh et al., 1999), scattered trees often function as "nurse plants" or "fertility islands", in that they provide favorable conditions for the recruitment of other plants (San José et al., 1991; Facelli and Brock, 2000). Plant species richness is typically higher under scattered trees than in the surrounding landscape, as demonstrated in Central America (Guevara et al., 1992), the Negev desert in Israel (Munzbergova and Ward, 2002), arid Australia (Facelli and Brock, 2000), and temperate Australia (Prober et al., 1998).

Scattered trees also are used by a wide range of animals throughout the world, in natural, cultural and recently modified scattered tree ecosystems. The micro-ecosystem surrounding an individual tree greatly enhances structural complexity relative to its surrounds. A wide variety of birds has been documented as using the canopies of scattered trees, for example, in Australia (Law et al., 2000; Fischer and Lindenmayer, 2002a), Central America (Guevara and Laborde, 1993; Harvey and Haber, 1999; Luck and Daily, 2003), southern Africa (Dean et al., 1999), and central Africa (Duncan and Chapman, 1999). Insectivorous bats in Australia forage around the canopy of scattered trees (Law et al., 1999, 2000; Lumsden et al., 2002; Lumsden and Bennett, 2005), and frugivorous bats make extensive use of scattered trees in many tropical landscapes (Duncan and Chapman, 1999; Galindo-González et al., 2000; Galindo-González and Sosa, 2003). A wide variety of canopy invertebrates has been recorded in Australia (Majer and Recher, 2000), and a range of ground-dwelling invertebrates have been documented below scattered trees within the dry, semi-deciduous forest zone in Ghana (Dunn, 2000) and under paddock trees in south-eastern Australia (Oliver et al., 2006). Cavities in scattered trees are used by a variety of birds,

mammals, reptiles and amphibians, as documented in Australia (Saunders et al., 1982; Gibbons and Lindenmayer, 2002; Manning et al., 2004a) and southern Africa (Dean et al., 1999).

3.2. *Scattered trees as biological legacies*

In landscapes that have been disturbed by natural processes or human activities, scattered trees play an important role as "biological legacies" (Elmqvist et al., 2002). Biological legacies are organisms or organically derived structures that persist after a disturbance (Franklin et al., 2000). Biological legacies have several functions including: representation of tree species per se (see above); assisting other species to persist (the so-called "life-boating" function, sensu Franklin et al., 1997); providing habitat for recolonization of a site (structural enrichment); influencing patterns of ecosystem recovery (nucleation); providing a source of energy and nutrients for other organisms; and stabilization of environmental conditions (reviewed by Lindenmayer and Franklin, 2002).

The concept of "nucleation" is used to describe the spreading of recovery from many different foci following a disturbance (Franklin and MacMahon, 2000), and is a particularly important function of scattered trees. In recently disturbed ecosystems, scattered trees can act as "regeneration nuclei" (Guevara et al., 1986). This can be in the form of seed directly from the trees (Cascante et al., 2002; Elmqvist et al., 2002), or indirectly from seeds deposited in droppings by organisms attracted to the trees, such as birds and bats (Guevara et al., 1986; Elmqvist et al., 2002). Scattered trees can therefore function as focal points for future restoration activities (Otero-Arnaiz et al., 1999; see below). Despite reduced genetic variability, the reproductive potential of scattered trees remains high in some landscapes (Cascante et al., 2002), and scattered trees represent potential sources for large-scale natural regeneration of Australian woodlands (Dorrough and Moxham, 2005) and Central American rainforests (Galindo-González et al., 2000). Natural regeneration is a substantially cheaper and ecologically preferable form of restoration than tree planting (McIntyre, 2002; Spooner et al., 2002). The "fertility island" effect of scattered trees (see above) further enhances their ability to act as central points of ecosystem recovery from which plant succession may radiate outwards into other parts of a given landscape (Toh et al., 1999).

Scattered trees are often the oldest living structures in disturbed landscapes and provide important ecological continuity through time. Ironically, although scattered tree ecosystems, such as wood-pastures, are often not regarded as "proper forest" (Rackham, 1998), they can provide refuges for organisms associated with original "natural" forest. For example, wood-pastures in Britain contain structures, species, and communities which are relicts of past management systems as well as original natural forest (Peterken, 1981, 1996; Kirby et al., 1995). Trees in British wood-pastures can live between 300 and 500 years and provide habitat for fungi and invertebrates associated with decaying wood and epiphytes largely absent in other forest types (Peterken, 1981, 1996; Alexander, 1999). Similarly, retained trees in recently logged boreal forests provide habitat continuity for lichen species that are directly dependent on these trees (Hazell and Gustafsson, 1999). Furthermore, in many human-modified ecosystems, scattered trees pre-date the era of tree planting and preserve local tree genotypes (Kirby et al., 1995).

3.3. *Landscape-scale ecological functions of scattered trees*

In addition to the local-scale ecological functions of a given individual scattered tree, in combination, multiple trees scattered throughout a landscape provide additional ecological functions (Fig. 2). The most obvious landscape-scale function of scattered trees is that they contribute to the overall amount of tree cover in a landscape. The density of trees is of considerable scientific and conservation interest in natural landscapes (Jeltsch et al., 1996; Mistry, 2000). Perhaps more importantly, scattered trees make an important contribution to overall tree cover in many cultural and recently modified landscapes. Recently modified ecosystems such as grazing landscapes in temperate Australia (Gibbons and Boak, 2002) and tropical Central America (Galindo-González et al., 2000) often contain a large proportion of their total remnant tree cover as scattered trees or small clumps of trees.

Tree cover is important for many animal species, and low amounts of tree cover in previously forested landscapes may lead to cascades of extinctions as a result of the simultaneous loss of the amount of unmodified vegetation and landscape connectivity (Andrén, 1994). Despite its modified status, a landscape mosaic characterized by scattered trees often provides habitat for a range of animal species, including birds and bats in both Central America (Guevara and Laborde, 1993; Galindo-González and Sosa, 2003) and south-eastern Australia (Law et al., 2000; Fischer and Lindenmayer, 2002a,b). A key feature of landscapes with scattered trees is that their connectivity remains relatively high for some animals (Guevara and Laborde, 1993; Graham, 2001; Fischer and Lindenmayer, 2002b).

Landscapes dominated by scattered trees can provide valuable foraging habitat for some animal species. For example, lichen forest in the forest-tundra transition zone of the boreal forest in Quebec may represent a large reservoir of forage for large caribou (*Rangifer tarandus*) herds (L. Sirois, pers comm.). Some species of bats and birds that use scattered trees for foraging are important seed dispersers. In tropical modified landscapes, frugivorous bats play a particularly important role in dispersing primary and secondary rainforest plants (Duncan and Chapman, 1999), thus increasing plant genetic connectivity and population viability (Cascante et al., 2002). The survival of bats in these landscapes therefore is considered key to future forest recovery (Galindo-González et al., 2000). Other mutualists of trees, such as pollinators, have been studied less extensively in modified landscapes (but see Ricketts et al., 2004). However, the general notion that a loss of landscape connectivity may result in the disruption of mutualist relationships in fragmented landscapes is well established (Cordeiro and Howe, 2003), and it is reasonable to expect that scattered trees will at least somewhat improve connectivity for a wide range of mutualist species.

More generally, scattered trees enhance landscape heterogeneity (the horizontal patchiness) of landscapes. For modified landscapes, it is widely accepted that other things being equal, increased landscape heterogeneity tends to increase landscape scale species richness (Benton et al., 2003; Luck and Daily, 2003).

In previously densely vegetated landscapes, scattered trees contribute to the "softening" of the matrix surrounding more discrete vegetation remnants (Lindenmayer and Franklin, 2002). Structural contrast at edges is widely acknowledged to result in a cascade of abiotic and biotic changes, ultimately leading to synergistic changes in both plant and animal life (Ries et al., 2004; Harper et al., 2005). Scattered trees reduce the structural contrast between patch edges and the matrix, and therefore reduce the likelihood and intensity of negative edge effects.

4. Threats to scattered trees

Scattered trees in natural, cultural and recently modified landscapes face some similar threats, as well as some threats that are unique to particular ecosystems. The most direct threat to all scattered trees is clearing by humans. For example, the legal and illegal removal of scattered trees is widespread in Australian grazing landscapes (Gibbons and Boak, 2002). Similarly, widespread land clearing continues in some Central American landscapes (Aguilar and Condit, 2001).

A slower, but equally problematic, threat to scattered trees is the lack of natural regeneration. Recruitment failure is often related to high grazing pressure, and may be a problem in natural, cultural and recently modified landscapes with scattered trees. Reduced recruitment of scattered trees has been reported in African savannas (N. Van Rooyen, unpublished data, cited in Jeltsch et al., 1996), Central American farming landscapes (Harvey and Haber, 1999; Graham, 2001), dehesas (Pulido et al., 2001), British wood-pastures (Kirby et al., 1995), and temperate Australian grazing areas (Spooner et al., 2002; Saunders et al., 2003). In the latter, the lack of recruitment threatens the persistence of scattered trees across vast areas of the wheat-sheep zones in eastern and Western Australia. In these landscapes, scattered trees without any younger generations of trees are "the living dead" (sensu Janzen, 1988). Because many scattered trees are dying of old age, a recent study in eastern Australia estimated a narrow window of opportunity spanning only a few decades in which large-scale tree regeneration will be possible (Dorrough and Moxham, 2005).

Some scattered tree ecosystems can be threatened by vegetation encroachment. For example, in many natural dry savannas, overgrazing can lead to shrub encroachment with often detrimental consequences for native species (Meik et al., 2002). In dry savannas, the negative impacts of livestock grazing are often exacerbated by changed fire regimes and strong rainfall events, leading to the invasion of thickets of unpalatable shrubs (Milton et al., 1994; Tews et al., 2004b). Maintaining appropriate grazing pressure is also important in British wood-pastures to sustain trees and open grassy areas in the same location (Kirby et al., 1995). In wood-pastures, both too much and too little grazing can be a threat. If there is too much grazing, trees do not regenerate; if there is too little grazing, open wood-pastures turn into denser forest ecosystems (Peterken, 1981, 1996).

These examples highlight that although the effect of grazing can vary, appropriate grazing regimes are pivotal to the continued existence of many ecosystems characterised by scattered trees. Determining what constitutes an appropriate grazing regime is not straightforward, and depends on the particular ecosystem under investigation. In many cases, choices need to be made about which species are in most urgent need of conservation attention. For example, Martín and Lopez (2002) found that lizard abundance in dehesas increased with dense understory vegetation. However, dense understory vegetation decreased the quality of hunting habitat for the endangered Spanish imperial eagle (*Aquila adalberti*).

Salinity can be an additional threat to scattered trees in both natural and human-dominated dry ecosystems. Scattered trees contribute to maintaining the ground water table at naturally low levels (Stirzaker et al., 2002). The removal of scattered trees, in turn, can lead to a rising ground water table, which can bring naturally occurring salts to the surface. The widespread removal of trees in temperate Australia has led to large-scale salinity problems, which now threaten both biodiversity and agricultural productivity (Saunders and Hobbs, 1995). Similar mechanisms also have led to increased salinity in some natural ecosystems such as the Negev desert in Israel (Munzbergova and Ward, 2002).

More generally, scattered trees may be threatened by poor tree health. In the Mediterranean, the tree root pathogen *Phytophthora cinnamomi* is causing a severe decline of oak species (*Quercus* spp.) (Plieninger et al., 2003). In Australia, rural dieback of eucalypts, where trees are severely defoliated, is leading to large-scale and premature tree death (Landsberg and Wylie, 1983). It is caused by complex interactions between numerous biotic and abiotic factors, including land management practices (Landsberg, 1990). In the United Kingdom, debarking by the introduced grey squirrel (*Sciurus carolinensis*) threatens the long-term persistence of wood-pastures (Mountford and Peterken, 2003).

Finally, land use intensification poses a threat to scattered tree ecosystems. In the Iberian dehesas, regeneration failure of oak has been exacerbated by recent agricultural intensification (Díaz et al., 1997; Pulido et al., 2001) and urban development (Plieninger et al., 2004). In Australia, scattered trees are more likely to be lost in cropping landscapes than in grazing landscapes (Ozolins et al., 2001). In addition, removal of fallen deadwood and standing dead trees for firewood (Driscoll et al., 2000) and the "tidying" of pastures by farmers (Reid, in litt.) can threaten the continued existence of key structural elements. Similar threats have been reported in British wood-pastures. Here, the removal of fallen deadwood and standing dead timber has eliminated mature habitat in many places, and recreation pressures such as car parks, heavy trampling and removal of dangerous branches at iconic locations, and vandalism are important threats to the long-term persistence of wood-pastures (Kirby et al., 1995; Peterken, 1996).

5. Scattered trees and landscape management

5.1. *Landscape management approaches*

One of the great challenges in landscape management is the trade-off between meeting short-term human needs and

maintaining the capacity to provide ecosystem services in the long term (Foley et al., 2005). There is a growing debate about the best way to manage landscapes in the face of growing human populations and associated demand for food. This debate has recently been framed as a trade-off between two approaches: "land sparing" versus integrated landscape management (Green et al., 2005; Mattison and Norris, 2005). Land sparing occurs where higher yielding parts of the landscape are intensively farmed to reduce pressure for more farmland. Integrated landscape management (also known as wildlife-friendly farming, sensu Green et al., 2005) is where native species are maintained across entire production landscapes (Green et al., 2005).

While land sparing may be attractive in theory (Green et al., 2005), it may be unsustainable in practice. First, there is no guarantee that land sparing will reduce forest loss because greater farm productivity can induce additional clearance to further increase profitability (Simon and Garagorry, 2005). Second, there is no guaranteed link between intensification in one place and reservation in another. Third, high productivity areas are most likely to be targeted for intensification, but are usually already the least reserved and most modified (Braithwaite et al., 1993; Lindenmayer and Franklin, 2002). Furthermore, the density of many organisms is skewed towards the most productive parts of landscapes (Braithwaite, 1983). Fourth, land sparing can result in the separation of commodity production and non-production areas, which ignores the interdependence of the two and the interaction of pattern and process in landscapes. Fifth, the consequences for long-term sustainability from land sparing are unknown because of potential lag effects on organisms and ecosystem processes arising from landscape consolidation. Sixth, land use intensification often eliminates key landscape elements, such as scattered trees, that obstruct machinery and intensive farming practices (Maron, 2005).

As a consequence of these issues, it may be difficult to differentiate the practical on-ground outcomes of land sparing from the traditional transition of land use, seen throughout human history, towards greater intensification and ecosystem fragmentation (sensu Saunders et al., 1991; McIntyre and Hobbs, 1999; Foley et al., 2005). As discussed above, land use intensification is a major threat to scattered tree ecosystems around the world. Evaluation of land sparing and consolidation of native ecosystems as land management options should first consider their possible shortcomings, and their potential effects on keystone structures such as scattered trees.

5.2. *Scattered trees and integrated landscape management*

Integrated landscape management attempts to reconcile conservation and production in the same landscape (sensu Hobbs and Saunders, 1991), and is practiced in many cultural scattered tree ecosystems, such as the dehesas or British wood-pastures. In integrated landscapes formerly covered by forest or woodland, scattered trees can be used as a useful landscape management tool which can complement conservation reserves and consolidated blocks of remnant vegetation.

Agroforestry, which is defined as "an intimate mixture of trees with farm crops and/or animals on the same piece of land" (Savill et al., 1997, p. 234), is a good example of how scattered trees can be used as a landscape management tool. Agroforestry has significant potential to achieve conservation goals in agricultural landscapes (Harvey et al., 2004; Salt et al., 2004) and lies at the intersection between agriculture and forestry. Both dehesas and wood-pastures are examples of agroforestry.

Some techniques from forestry also offer useful insights on the benefits of integrating scattered trees in landscapes over the long term. The notion of biological legacies (see above) underpins the technique of "green tree retention" which is increasingly being used in boreal forest management (Vanha-Majamaa and Jalonen, 2001). With green tree retention, a certain number of trees are retained permanently after harvesting to mimic conditions after a moderate-intensity natural disturbance (Vanha-Majamaa and Jalonen, 2001; Lindenmayer and McCarthy, 2002). The main purposes of green tree retention are:

- the "life-boating" of species and processes after logging as tree cover is re-established;
- the enrichment of re-established stands with structural elements; and
- the enhancement of landscape connectivity (Franklin et al., 1997).

Green tree retention can maintain canopy continuity, preserve old and large trees and maintain habitat and structural diversity. There are two spatial patterns of green tree retention. First, in "dispersed retention" retained structures are distributed evenly throughout the harvest unit. This form of retention is also useful for dispersing mitigating effects (such as modification of microclimate, hydrology or soil stabilization through roots) over the whole stand (Franklin et al., 1997; Lindenmayer and Franklin, 2002). Second, in "aggregated retention" small patches are retained to be representative of the original stand conditions and to provide intact understory and soil organic layers. Unlike dispersed retention, effects of this approach are confined to the immediate area around the retained patch (Franklin et al., 1997; Lindenmayer and Franklin, 2002). Green tree retention thus contributes to a continuum of possible forest management options, and represents one end which explicitly recognizes the value of scattered trees.

The principles underpinning agroforestry and green tree retention have implications for the management of existing scattered tree ecosystems and formerly wooded and forested landscapes. Variable retention harvest systems (which include green tree retention as a component) provide "a continuum of structural retention options" (Franklin et al., 1997, p. 115). The idea of a continuum of landscape management options, from consolidated patches through to areas of scattered trees offers a promising approach to landscape management. As a practical approach to managing landscapes, this would be highly compatible with recent developments in the area of landscape concepts. Scattered trees do not fit well into schematic "patch-matrix-corridor" landscape models which categorize landscapes either "habitat" or "non-habitat" (McIntyre and Hobbs, 1999; Manning et al., 2004b). This is

because they occur in what is generally considered the "matrix". It is now recognized that many landscapes have habitat that is modified, but not destroyed ("landscape variegation" sensu McIntyre and Hobbs, 1999). It is also recognized that vegetation often occurs in spatial continua and habitat boundaries are often indistinct or gradual (McIntyre and Hobbs, 1999; Manning et al., 2004b). Further, different organisms perceive and respond to the same landscape differently (the Continua- *Umwelt* concept, Manning et al., 2004b). This paper demonstrates that many organisms consider scattered trees as important habitat. The maintenance and expansion of scattered trees across landscapes, and the use of techniques such as agroforestry and green tree retention, are highly compatible with these continua-based landscape concepts. It is thus possible to envisage future landscapes where consolidated conservation areas will be embedded within integrated, multi-use scattered tree ecosystems.

In grazing landscapes, such as those in temperate Australia, regeneration of scattered trees could be encouraged through techniques such as micro-restoration. The aim of micro-restoration is to facilitate the regeneration of saplings in the immediate vicinity (<30 m radius) of existing large scattered trees thereby maintaining the spatial pattern of scattered trees (Lindenmayer et al., 2005; Fig. 3). Methods for micro-restoration will be locally specific, and dependent on the specific mechanisms involved in the regeneration of particular tree species. However, methods might include encouragement of regeneration by placing small temporary fences around individual mature trees or groups of trees to exclude grazing, direct planting and seeding, soil scarifying or burning beneath existing trees. Notably, micro-restoration could be useful in complementing existing restoration programs which aim to establish large and consolidated patches of native vegetation (Bennett et al., 2000). Other management strategies might include reduced stocking rates or alternative grazing regimes (Jansen and Robertson, 2001; Spooner et al., 2002).

Future landscape management approaches, using a range of tree retention and regeneration techniques, would ideally recognize the complementary contributions of large patches of native vegetation and extensive areas of scattered trees, and provide a promising vision for genuine and sustainable integration of conservation and production.

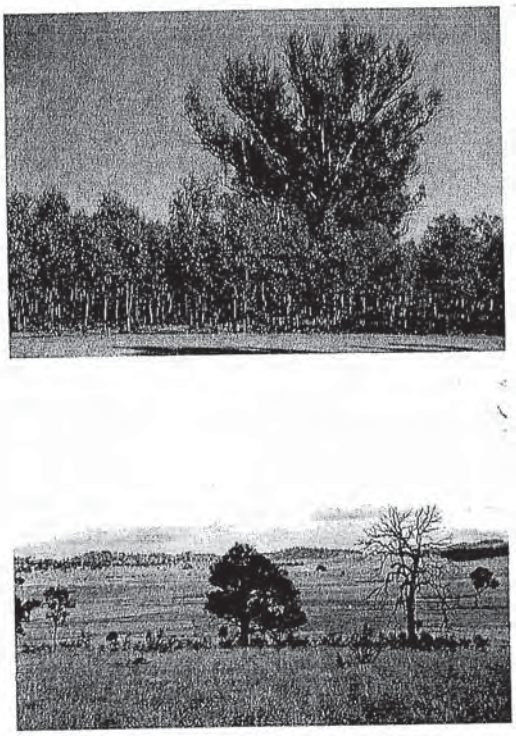

Fig. 3 – Micro-restoration is where tree regeneration is facilitated in the immediate vicinity (<30 m radius) of an existing scattered tree. These examples, from south-eastern Australia, show what micro-restoration might look like (top photo by D. Lindenmayer, bottom photo by A. Manning).

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Attach B

Oaks 2040: The Status and Future of Oaks in California

By Tom Gaman and Jeffrey Firman[1]

Introduction: Developing planning tools for oak futures in California

Ecological functions, wildlife habitat, recreational opportunities and scenic values are seriously impaired as population densities and other landscape use pressures increase. Managers of oak woodlands and forests need to balance the biological, sociological and economic interests of private landowners, public agencies, business, universities, environmental groups and concerned individuals. Planning must address the complexities of local, regional and state-wide oak issues within the context of practical on-the-ground land use decisions.

Oaks 2040 is based on objective oak data and is designed to serve decision makers who may develop local and regional Oak Woodlands Management Plans or advance other conservation strategies. A statewide map of oak distribution and a current forest and woodland inventory, created by state and federal researchers, were the starting points for Oaks 2040. From those, regional analyses of forest structure and oak types as well as region-specific oak inventory summaries have been developed. By evaluating these maps and inventories against current economic growth projections, Oaks 2040 identifies the location and extent of oaks most at risk.

Cover photo: Black Oak at Big Sur

[1] Tom Gaman tgaman@fforestdata.com and Jeffrey Firman jfirman@fforestdata.com of Forest Data, P.O. Box 276, Inverness, CA 94937. Gaman and Firman (see www.forestdata.com) have been active many years in forest inventory, data analysis, mapping and forest conservation. Both have master's degrees in forestry from Yale University. Gaman is a registered professional forester and a board member of the California Oak Foundation.

Citizens Concerned with Oak Conservation:

Oaks are more than a distinct component of the landscape for many of us who live in California. For hundreds of years, people have lived in, raised families under, and worked around these generous, natural and cultural icons. Today, increasing population pressures and poorly-planned development are threatening oak sustainability.

The Oak Woodland Conservation Act requires cities and counties to assess their wealth in oak resources and to adopt Oak Woodlands Management Plans in order to meet the need for healthy watersheds, clean air and water, and sufficient high quality wildlife habitat. These Plans must include a description of native oak species and their current and historical distribution, as well as existing threats, status of natural regeneration and urban growth trends. These Plans must also recognize the economic value of oak woodlands in their respective jurisdictions and encourage and support farming, ranching and grazing operations compatible with oak woodland conservation.

Oaks 2040 is designed to provide various stakeholders involved with developing or updating their community's Oak Woodlands Management Plan with current information on 48 of the 58 counties that contain significant oak resources. Every effort has been made to present this important information fairly.

Readers must realize, however, that COF is an advocate for sustainable oak resources. To that end, the full report mentions the importance of using available tools, such as acquisition in fee, conservation easements in perpetuity, deed restrictions and oak mitigation banks, in a timely fashion to achieve conservation of oak resources.

COF's Board of Directors thanks its members, associates and friends for their individual and collective efforts to establish a viable Oak Reserve system made up of well-managed oak woodlands and forests on private and public lands throughout California.

Sincerely,
Janet Santos Cobb

Methods

MAPPING OAK TYPES

A number of overall vegetation maps, maps of hardwoods in general, and oak-specific maps have been generated over the years. Currently, the most reliable statewide vegetation map available is the "LCMMP Vegetation Map" (FRAP map) produced by the California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) in conjunction with the US Forest Service (USFS) Region 5 Remote Sensing Lab (RSL) in Sacramento. While these maps do not focus specifically on oaks, oak habitat types can easily be extracted from these vegetation types. Using these maps as a foundation (supplemented by other earlier mapping efforts), species-specific range maps of oak types throughout the state (FRAP 2005) have been generated.

The FRAP map uses the *Calveg* classification system which first divides all vegetation into *Covertype*. Covertype can be equal to the following: conifer (CON), shrub (SHB), barren (BAR), hardwood (HDW), grass (HEB), water (WAT), conifer/hardwood mix (MIX), urban (URB), or agricultural (AGR). For finding oak habitat, only two *Covertypes* are relevant. All *woodland* classified as 'hardwood' (HDW) or *forest* classified as 'conifer/hardwood mix' (MIX) can potentially be oak habitat provided it contains the relevant hardwood species. All other *Covertypes* were eliminated from the analysis.

"The Oak Woodland Conservation Act requires cities and counties to assess their wealth in oak resources and to adopt Oak Woodlands Management Plans in order to meet the need for healthy watersheds, clean air and water, and sufficient high quality wildlife habitat."

After *Covertype*, the Calveg system also specifies *Vegtype*, which identifies the dominant species association. For both HDW and MIX covertypes, the data were screened to ensure that the hardwood associations being mapped in a particular location are oaks. Dozens of hardwood *Vegtypes* are mapped throughout the state, but only twelve are dominated by tree oaks. Nine of these are dominated by a single species, each forming its own Oak Habitat Type, or "Oak Type." Three heterogeneous hardwood types were combined to generate a "mixed" Oak Type. The ten resulting Oak Types, each potentially occurring in both "woodlands" and "forests"[2], are listed in the following Table 1:

This rigorous selection and reclassification process was applied to the FRAP maps. The results are GIS layers and maps depicting the distribution of woodland and forest oak habitat types throughout California. These geographic data provide the foundation for the landscape-level analysis of the distribution and diversity of California's oak woodlands and oak forests. See the tables in Appendix A for acres of cover where oaks dominate the woodland by county and Oak Type and acres of cover where oaks are present in the forest by county and Oak Type.

OAK TYPE	SCIENTIFIC NAME	TYPE(S)
Black Oak	*Quercus kelloggii*	QK
Blue Oak	*Quercus douglasii*	QD
Canyon Live Oak	*Quercus chrysolepis*	QC
Coast Live Oak	*Quercus agrifolia*	QA
Engelmann Oak	*Quercus engelmannii*	QN
Interior Live Oak	*Quercus wislizeni*	QW
Oregon White Oak	*Quercus garryana*	QG
Tanbark Oak	*Lithocarpus densiflorus*	QT
Valley Oak	*Quercus lobata*	QL
Mixed Oaks	not applicable	EX/NX/TX

Table 1. Oak Types

[2] "Oak Woodlands" are considered to be those mapped vegetation types where oaks dominate the landscape. By definition, they have at least 10% canopy cover. "Oak Forests" are those vegetation types dominated by trees, but *Quercus spp.* or *Lithocarpus densiflorus* may not necessarily be among the dominant species.

OWNERSHIP AND AT RISK ANALYSIS

Two additional layers are added to further intensify the oak mapping analysis. Land ownership and development risk layers are incorporated into the map to assess pertinent conservation issues. The land ownership data is courtesy of the California Department of Forestry's Forest and Rangeland Resources Assessment Program (FRAP 1999). Using the FRAP layer, the state is divided into a variety of public and private ownership categories. The statewide ownership layer overlaid on top of the Oak Type map reveals ownership patterns of California's oaks.

The development risk data has been derived from the California Department of Finance's projected development layer. This dataset is based on 2000 US Census Data (FRAP 2001). This layer tracks past development by decade and predicts future development through 2040. Using this information, three categories were defined. 'Developed' is defined as anything that has been developed (greater than 32 housing units per square mile) by 2000. 'At Risk' refers to anything that has not been developed by 2000 but is expected to develop by 2040. 'Stable' refers to anything that has not been developed by 2000 and is unlikely to be developed before 2040.[3] Once the layer was divided into these three categories, it was overlaid on top of the Oak Type Map. The oak woodlands of the state were thereby divided into groups by oak type, ownership and development risk.

INVENTORY AND ANALYSIS

The other critical element for assessment of mapped oak types is the inventory summary, which is based upon data obtained from the USFS Forest Inventory and Analysis Program (FIA). This statewide grid of permanent forest survey sample "plots" yields information about what the mapped oak forests and woodlands look like on the ground. The plots provide information not obtainable via remote sensing techniques – an inventory of forest fuels, species distribution, specific size, growth, regeneration, habitat features, pest and disease. With point-specific data ranging from species composition to seedling regeneration to tree size and density, these plots help one understand the makeup of each of the ten oak types.

The most recent FIA field data was obtained to provide an inventory of each of the oak types discussed above. Combining the ground-based survey data and the GIS mapping data enabled the authors to provide a comprehensive oak inventory using new vegetation maps and the 2001-2004 FIA inventory data.

Using conventional computer programs, inventory data was processed to produce summaries of each plot. The survey plots were grouped by oak type within each region and a customized program was used to produce inventory summaries per acre by oak type by region. Regional totals were then summed up to provide an inventory for the entire state. A variety of other factors were analyzed using the inventory data including basal area and tree counts per acre of oaks relative to total trees, size distribution, regeneration status, and determination of associated hardwood and conifer species. Appendix B summarizes these details for woodlands and forests statewide by oak type.

[3] The 'developed' and 'at risk' designations are assigned to privately owned lands only, as those held in public ownership are considered 'stable' with regard to development. However, publicly-owned lands do face other challenges such as poor oak regeneration and non-sustainable land management practices.

California oaks: the statewide analysis

To facilitate statewide analysis, California counties have been grouped into six distinct regions, each of which is discussed later in this report. In an attempt to represent the levels at which conservation policy is often decided, county boundaries have been utilized for this regional split (see Figure 1), rather than natural boundaries such as watersheds or bioregions.[4] The tables in Appendix B summarize inventory details for woodlands and forests statewide by oak type.

"The plots provide information not obtainable via remote sensing techniques – an inventory of forest fuels, species distribution, specific size, growth, regeneration, habitat features, pest and disease."

Figure 1 – California is divided into six regional groupings of counties.

[4] These are the same regions used in Bolsinger's 1988 *The Hardwoods of California's Timberlands, Woodlands, and Savannas*, except that the San Joaquin Valley has been separated from the rest of Southern California.

OAKS PLAY A MAJOR ROLE IN THE CALIFORNIA LANDSCAPE

California has approximately 8.5 million acres of oak woodland and 4.5 million acres of oak forest. These 13 million acres comprise more than one-eighth of the state's area (see Figure 2). The Sacramento and San Joaquin regions are home to more than half of California's oak woodland. Oak forests are concentrated in the North Coast and North Interior regions. California currently has approximately two billion oaks greater than 1" DBH. More than 800 million of these oaks are larger than 5" DBH.

California oaks are diverse. Blue oak is California's dominant oak species, representing more than one-third of the state's oak woodlands. Canyon, coast and interior live oak woodlands comprise approximately one-third of California's oak woodlands. Tanbark, black and canyon live oak forests account for more than 80 percent of California's oak forests.

In oak woodland, oaks comprise 60 percent of the total tree basal area, 67 percent of trees greater than 5" DBH and 37 percent of trees greater than 24" DBH. In oak forest, oaks comprise 18 percent of the total tree basal area, less than 24 percent of trees greater than 5" DBH and eight percent of trees greater than 24" DBH. Blue oak, Oregon white oak and, to a lesser extent, interior live oak, are regenerating poorly. Blue oak averages about one seedling per thousand square feet in woodlands, and less than one seedling (one foot or more in height) per two established oak trees. Not a single Engelmann oak or valley oak seedling was tallied on any of the 932 FIA plots.

OAKS 2040: FUTURE PROSPECTS FOR CALIFORNIA'S OAKS

More than one million acres of California's oak woodlands are developed and approximately 750,000 are at risk of development before 2040. Twenty percent of California's oak woodlands are facing rapid and increasing urbanization by 2040. The oak woodlands of the Central Valley and Sierra Foothills face the most immediate threats. Eighty percent of California's oak woodlands that are at risk of development are located in the Sacramento and San Joaquin regions. See Figure 3.

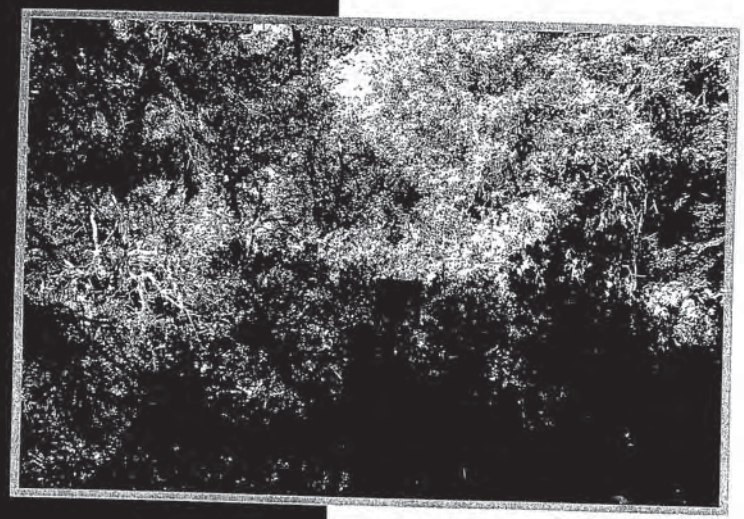
"More than one million acres of California's oak woodlands are developed and approximately 750,000 are at risk of development before 2040."

Figure 2 – This map shows the distribution of oak woodlands and oak forests.

Figure 3 – This map illustrates the distribution of California's oaks 'developed,' 'at risk' and 'stable.'

North Coast Region

Del Norte
Humboldt
Mendocino
Sonoma



Oaks 2040 co-author Tom Gaman is pictured in a mixed forest of Oregon white oak, interior live oak and canyon live oak.

California Oaks: The Regional Analyses

This section provides regional summaries. Each regional description includes oak distribution, oak woodland, oak forest diversity and oaks at risk.[1]

[1]Appendix B summaries herein presented statewide are further detailed by region in the full report online at http://www.californiaoaks.org/Oaks2040.

North Coast Region

Counties included in this region are Del Norte, Humboldt, Mendocino and Sonoma.

OAK DISTRIBUTION

The North Coast Region has 1.3 million acres of oak woodland and 1.5 million acres of oak forest. In fact 35 percent of California's oak forest is found in the North Coast region, and oaks are present on 45 percent of the region's land (more coverage than any other region).

Mendocino County contains more than one-half of the region's oak woodland, but Humboldt and Sonoma counties also have significant stands. The North Coast's oak forests are found primarily within Humboldt and Mendocino counties.

In the North Coast region, there are 210 million oaks greater than 1" DBH and 110 million oaks greater than 5" DBH. Only the Central Coast tops the North Coast's two million oaks with DBH greater than 24".

NORTH COAST OAK DIVERSITY

The North Coast oak woodlands feature Oregon white oak, tanbark oak and mixed oak. Canyon live oaks and black oaks are also present, mixing in with Douglas-fir, madrone and bay. Oaks comprise approximately one-half of the basal area, trees/acre, and trees greater than 5" DBH/acre in white oak woodlands. In tanbark oak woodlands, *Quercus spp.* (true oaks) comprise less than 20 percent of the basal area, trees/acre, and trees greater than 5" DBH/acre, but when including tanbark oak *(Lithocarpus densiflorus)* oaks then comprise 48 percent of basal area and number of trees per acre.

In the North Coast's oak forests, tanbark oak is predominant. Associated species include Douglas-fir, redwood, madrone, bay, canyon live oak and black oak. In tanbark oak forests, oaks provide 42 percent of the basal area and more than half of total trees greater than 1" DBH.

OAKS AT RISK IN THE NORTH COAST REGION

In terms of ownership, 84 percent of the North Coast's oak woodlands are located on private property. Most of the remainder is owned by the USFS and various other federal government agencies. Private ownership of oak woodland increases moving southward, ranging from 40 percent in Del Norte County to 95 percent in Sonoma County. Eight percent of North Coast oak woodlands have already been developed and four percent are at risk of near-time development. Nearly 90 percent of the oak woodlands are reasonably stable for the time being.

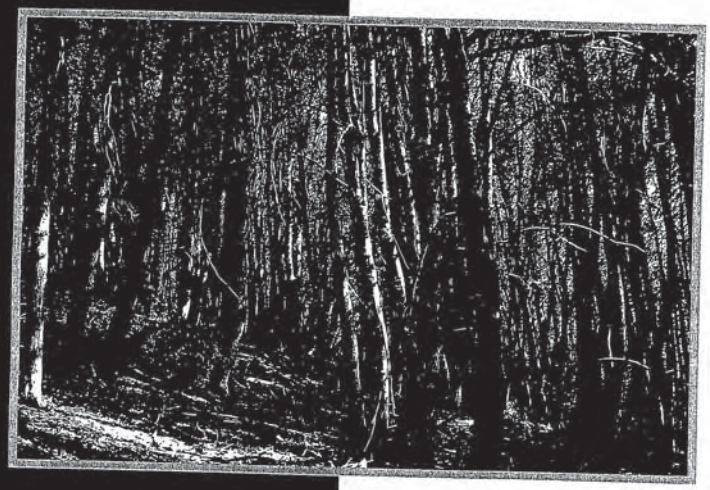
Sonoma County has experienced the most urbanization with 20 percent of oak woodlands developed and 10 percent at risk. Oak woodland development rates are relatively low in Del Norte and Humboldt counties with more than 95 percent of oak woodlands being stable for now. Mendocino County oak woodland is already five percent developed and another five percent is at risk of development before 2040.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach B

North Interior Region

Lassen
Modoc
Shasta
Siskiyou
Trinity



Tanbark oak forest

North Interior Region

Counties in this region are Lassen, Modoc, Shasta, Siskiyou and Trinity.

OAK DISTRIBUTION

Nearly one million acres of oak woodland and 1.1 million acres of oak forest reside within the North Interior. The North Interior and the North Coast are the only two regions with more oak forest than oak woodland. With over 550,000 acres of oak woodland, Shasta County contains more than half of the region's totals. Trinity and Siskiyou Counties also contain large areas of oaks, with nearly 800,000 acres of oak forest and more than 400,000 acres of oak woodland in total. The North Interior has nearly 400 million oak trees, and 150 million of these oaks are greater than 5" DBH.

NORTH INTERIOR REGION OAK DIVERSITY

In this region, a balanced mixture of blue oak, black oak, canyon live oak and Oregon white oak woodlands is found. Blue oak woodlands typically include gray pine and either interior or coast live oak, and oaks comprise more than 80 percent of the basal area and more than 90 percent of the trees. Oregon white oak woodlands include black oak, Douglas-fir, and ponderosa pine, and oaks make up 40 percent of the basal area and more than half of the trees greater than 5" DBH. In black oak and canyon live oak woodlands, oaks comprise 50 percent of the basal area and 70 percent of the trees greater than 5" DBH.

In the North Interior oak forests, canyon live oak and black oak are prominent. These two oak species mix in with the local conifer species, including Douglas-fir, ponderosa pine, sugar pine and madrone. In black oak forests, oaks comprise one-fifth of the basal area. One-third of the trees greater than 5" DBH are oaks. In canyon live oak forests, one-third of the tree basal area is oaks and less than half of the trees greater than 5" DBH are oaks.

OAKS AT RISK IN THE NORTH INTERIOR REGION

In terms of ownership, 60 percent of North Interior oak woodlands are privately owned. The USFS manages 33 percent and the Bureau of Land Management (BLM) manages six percent. Excluding Shasta County, oak woodland ownership is split roughly 50-50 between private and public; the USFS manages most of the public oak woodland. Shasta County's oak woodland ownership is 73 percent private, 20 percent USFS, and six percent BLM.

Ten percent of the region's oak woodland has already been developed. Three percent is at risk for development by 2040. Eighty-seven percent is unlikely to develop before 2040. Shasta County oak woodland is most at risk with fifteen percent having been developed and five percent more to be developed by 2040. Oak woodlands in Trinity, Siskiyou, Modoc and Lassen Counties are all less than five percent developed and less than one percent at risk.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

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Central Coast Region

Alameda
Contra Costa
Marin
Monterey
San Benito
San Francisco
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Solano
Ventura

Coast live oak savannah in Marin County

Central Coast Region

Counties included in this region are Alameda, Contra Costa, Marin, Monterey, San Benito, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano and Ventura.

OAK DISTRIBUTION

The Central Coast is home to 1.6 million acres of oak woodlands and 300,000 acres of oak forests. Oaks are present on 17.5 percent of the region's area.

Four counties provide 75 percent of the Central Coast oak woodlands: Monterey, Santa Barbara, Santa Clara and San Luis Obispo. Oak woodlands comprise more than 20 percent of the area in Alameda, Monterey and Santa Clara counties. Santa Cruz County has more than 100,000 acres of forest oaks, and there are oaks present on over 50 percent of county land.

CENTRAL COAST OAK DIVERSITY

One-half of the Central Coast's oak woodland is coast live oak, and one-third is blue oak. Eighty percent of California's coast live oak woodland is in the Central Coast. Coast live oak woodland regularly includes bay trees, but oaks account for nearly 80 percent of the basal area in this oak type and over 90 percent of the trees greater than 10" in diameter. Blue oak woodland often includes coast live oaks.

Overall, more than 95 percent of trees in all size classes are oaks. Mixed oak woodlands include coast live oak and bay mixing with black and/or blue oaks. Oaks account for more than 60 percent of the basal area and more than 50 percent of the trees greater than 5" DBH in these stands. Thirty percent of the state's valley oak woodland is in the Central Coast, but there is not adequate inventory data to confidently describe this critical oak type.

Tanbark oak and coast live oak account for three-quarters of the region's oak forests. Redwood and Douglas-fir are dominant in tanbark oak forests, but oaks comprise 40 percent of the trees greater than 5" DBH and one-quarter of the basal area. Coast live oak forests often include canyon and/or interior live oak, with bay and redwood or Douglas-fir. Overall, oaks account for 10 percent of the basal area of oak forest stands and provide more than 20 percent of the trees greater than 5" DBH.

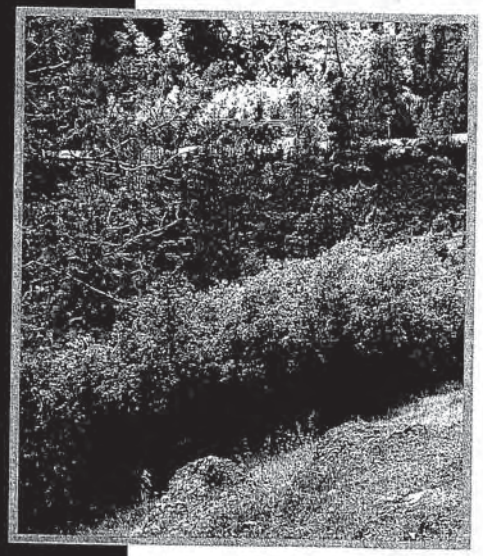
OAKS AT RISK IN THE CENTRAL COAST REGION

A complex land ownership matrix covers the oak woodlands of the Central Coast. Private ownership of oak woodlands predominates, averaging 75 percent throughout the region and ranging from 65 percent in Santa Barbara County to 95 percent in Alameda County. Another 15 percent is managed by the Los Padres National Forest, five percent by the US Military, and five percent by state and local governments. The Los Padres National Forest covers much of the oak woodlands in Ventura, Santa Barbara, San Luis Obispo and Monterey counties. Additionally, the BLM manages 20 percent of San Benito's oak woodlands and Fort Hunter-Liggett holds 12 percent of Monterey's oak woodlands. The state owns approximately 10 percent of oak woodland in Santa Clara, Contra Costa and Santa Cruz counties. Local ownership covers nearly 20 percent of oak woodland in Marin and Contra Costa counties.

Almost 85 percent of the Central Coast oak woodlands are unlikely to be developed before 2040. Most of the remaining areas have already been developed. Less than three percent is still at risk of development. Monterey County once again leads the way with 24,000 acres of oak woodland at risk, more than half of the region's total. Santa Clara, Santa Barbara, and San Luis Obispo counties are next on the list. Four percent of Monterey's oak woodlands are at risk, topped in the region only by Santa Cruz County at eight percent. In fact, more than three-quarters of Santa Cruz's oak woodlands have already been developed and less than 16 percent are currently in the stable category. Both of these figures are records for the state.

Sacramento Region

Butte
Colusa
El Dorado
Glenn
Lake
Napa
Nevada
Placer
Plumas
Sacramento
Sierra
Solano
Sutter
Tehama
Yolo
Yuba



Mixed oak woodland dominated by gray pine

Sacramento Region

Counties in this region include Butte, Colusa, El Dorado, Glenn, Lake, Napa, Nevada, Placer, Plumas, Sacramento, Sierra, Solano, Sutter, Tehama, Yolo and Yuba.

OAK DISTRIBUTION

The Sacramento region's 2.1 million acres of oak woodlands provide nearly one-quarter of the state's total. Oaks are present on 20 percent of the region's land.

Tehama County has more oak woodlands than any other county in the region, but large oak populations are found in many counties. Thirty-three percent of Napa County is covered by oak woodlands, giving it the greatest density of oak woodlands in the state. Tehama, Yuba, Lake and Nevada counties are each at least 20 percent covered by oak woodlands.

SACRAMENTO REGION OAK DIVERSITY

More than half of the Sacramento region's oak woodlands are blue oak. Gray pines mix in, but oaks comprise 70 percent of the basal area and 80 percent of the trees greater than 5" DBH. The region contains more than one-third of the state's blue oak woodland.

Interior live oak woodland contains blue oak, valley oak, black oak, gray pine, and ponderosa pine. Canyon live oak and black oak woodlands include Douglas-fir, ponderosa pine, and incense cedar. In canyon and interior live oak woodland, oaks make up 80 percent of the basal area and 90 percent of the trees.

The Sacramento region has more than one-third of California's valley oak woodland. Tehama County has the most blue oak, valley oak and canyon live oak woodland. El Dorado has the most interior live oak and black oak woodland.

Black oak and canyon live oak dominate the region's oak forests. Canyon live oak forests are 60 percent oaks, mixing with ponderosa pines and Douglas-firs. Black oak forests are 25 percent oaks, along with Douglas-fir, ponderosa pine, white fir and incense cedar.

OAKS AT RISK IN THE SACRAMENTO REGION

More than 80 percent of the Sacramento region's oak woodland is privately owned. The USFS owns about 60 percent of the remaining public lands, including large portions of the oak woodlands in Plumas (81 percent), Sierra (74 percent), Glenn (28 percent), Placer (20 percent) and Lake (19 percent) counties.

Private ownership of oak woodlands surpasses 80 percent in all other counties, topped off by Solano (98 percent), Yolo (97 percent), Sacramento (96 percent), Colusa (94 percent), and Napa (93 percent) counties.

The Sacramento region is more at risk of development than any other. Only two-thirds of its oak woodlands are considered 'stable.' One-sixth is developed and one-sixth is at risk. More than 300,000 acres of oak woodland could be developed in the Sacramento region by 2040.

El Dorado County has more oak woodlands at risk than any other county in the state, but Tehama, Butte and Yuba counties are not far behind. By 2040, 80 percent of El Dorado's oak woodlands and more than half of the oak woodlands in Nevada, Yuba and Placer counties may be developed.

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San Joaquin Region

Alpine
Amador
Calaveras
Fresno
Inyo
Kern
Kings
Madera
Mariposa
Merced
Mono
San Joaquin
Stanislaus
Tulare
Tuolumne

Valley oaks in Calaveras County

San Joaquin Region

Counties in this region are Alpine, Amador, Calaveras, Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Mono, San Joaquin, Stanislaus, Tulare and Tuolumne.

OAK DISTRIBUTION

The San Joaquin region has more than 2.3 million acres of oak woodlands and 500,000 acres of oak forests. Oaks are present on only 10 percent of the region's land. However, certain portions of the region have far greater oak woodland density than others. Twenty-seven percent of the state's oak woodlands fall within these 15 counties. The San Joaquin region currently has more than 450 million oak trees. More than one-third of these oaks are larger than 5" DBH.

SAN JOAQUIN REGION OAK DIVERSITY

More than half of the region's oak woodlands are blue oak and another 25 percent are interior live oak. Associated species include gray pine and buckeye, as well as valley oak, blue oak and canyon and interior live oaks. The San Joaquin region has more blue oak woodlands and interior live oak woodlands than any other region. In blue oak woodlands, oaks account for 70 percent of the trees and 80 percent of the basal area and trees greater than 5" DBH. In interior live oak woodlands, oaks provide 70 percent of the tree basal area and more than 80 percent of all trees. In canyon live oak woodlands, oaks comprise 55 percent of the basal area, 62 percent of all trees and 67 percent of trees greater than 5" DBH.

Canyon live oak and black oak comprise almost 90 percent of oak forests. Associated species in San Joaquin oak forests include incense cedar, ponderosa pine, sugar pine and white fir. In canyon live oak forests, oaks provide one-third of the basal area and nearly one-half of the trees. In black oak forest, oaks comprise more than half of the trees, but only one-third of the trees greater than 5" DBH and only one-quarter of the tree basal area.

OAKS AT RISK IN THE SAN JOAQUIN REGION

Seventy-three percent of the San Joaquin region's oak woodlands are privately owned. The USFS owns 18 percent and BLM owns five percent. Ten percent of the oak woodlands in the region have already been developed. Ten percent are at high risk of development by 2040. Eighty percent are currently stable, however targeted planning could ensure that a greater number of acres are conserved for the long-term. Nearly 250,000 acres of oak woodlands in the San Joaquin region are at risk of development by 2040. Only the Sacramento region contains more oak woodlands at risk. In Madera, Amador and Calaveras counties combined, more than one-third of all oak woodland may be developed before 2040.

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Southern Region

Imperial
Los Angeles
Orange
Riverside
San Bernardino
San Diego

Blue oak woodland in Machesna Mountain Wilderness, Los Padres National Forest

Southern Region

Counties in this region are Imperial, Los Angeles, Orange, Riverside, San Bernardino and San Diego.

OAK DISTRIBUTION

The Southern region is home to more than 300,000 acres of oak woodlands and more than 200,000 acres of oak forests. Combined, these 500,000 acres comprise only two percent of the region. However, discounting urban areas and desert, oak woodland concentration is much higher. San Diego and Los Angeles counties collectively contain more than two-thirds of the Southern region's oak woodlands. San Bernardino County has the greatest area (90,000 acres) of oak forests in the region.

SOUTHERN REGION OAK DIVERSITY

Coast live oak and canyon live oak are most prevalent, but black oak and Engelmann oak populations are also significant. Eighty-five percent of the basal area is comprised of oaks. Ninety-two percent of the trees greater than 5" DBH are oaks and 96 percent of the trees greater than 1" DBH are oaks. The rare Engelmann oak is found only within this region, mostly in San Diego County. Los Angeles County is home to the majority of the region's blue oak and valley oak woodlands.

Canyon live oak and black oak dominate in the Southern region's oak forests. These oaks mix with Coulter pine, Jeffrey pine, incense cedar and white fir.

Oaks comprise less than 50 percent of the basal area but more than 80 percent of the trees and 65 percent of the trees greater than 5" DBH.

OAKS AT RISK IN THE SOUTHERN REGION

The oak woodlands of the Southern region have the highest levels of public ownership found in the state. USFS owns 44 percent of the region's oak woodlands. Eleven percent of oak woodlands are owned by other government agencies, and 45 percent are privately owned. The land ownership patterns within this region are variable. The oak woodlands in San Diego and Orange counties are predominantly privately-owned, but the USFS owns most of the oak woodlands in San Bernardino, Riverside and Los Angeles counties.

Twenty percent of the Southern region's oak woodlands have already been developed. Ten percent are at risk of development by 2040. Development of the remaining 70 percent is not anticipated in the near future. Oak woodland development percentages are higher than in any other region in the state. Only the Sacramento region has a lower percentage of oak woodlands that are considered stable.

Riverside and San Diego counties lead the region with almost 20 percent of their oak woodlands at risk. Both Orange and Los Angeles counties have already had over 20 percent of their oak woodlands developed.

San Diego and Orange counties have the lowest percentages of stable oak woodland with 65 percent in each county. San Bernardino tops the list with 78 percent stable for the time being.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

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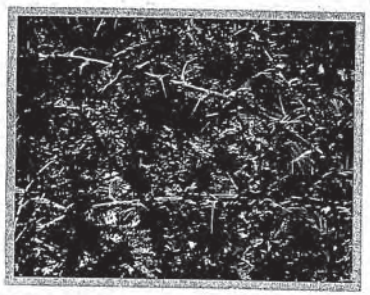

Post-fire black oak regeneration in Mendocino National Forest

APPENDIX A – TABLE ONE: ACRES OF COVER WHERE OAKS DOMINATE THE WOODLAND BY COUNTY AND OAK TYPE

REGION	COUNTY	OAK TYPE									
		Black Oak	*Blue Oak*	*Canyon Live Oak*	*Coast Live Oak*	*Engelmann Oak*	*Interior Live Oak*	*Mixed Oak*	*Oregon White Oak*	*Tan Oak*	*Valley Oak*	*Total Acres*
North Coast	Del Norte	84	0	1,011	0	0	0	2,939	355	42,778	0	47,168
	Humboldt	16,671	0	20,831	10	0	0	13,572	100,484	153,873	0	305,442
	Mendocino	49,553	12,040	60,603	863	0	16,715	119,231	283,036	104,631	4,206	650,879
	Sonoma	3,212	524	7,354	21,601	0	1,484	176,852	41,124	30,402	524	283,077
North Interior	Lassen	7,965	0	0	0	0	0	0	438	0	0	8,403
	Modoc	737	0	0	0	0	0	0	369	0	0	1,106
	Shasta	170,028	268,857	83,918	0	0	4,643	46	21,116	336	6,055	554,998
	Siskiyou	13,053	0	57,570	0	0	0	10,141	97,529	5,646	0	183,938
	Trinity	51,154	275	84,077	0	0	0	0	80,692	15,747	11	231,956
Central Coast	Alameda	0	29,273	12	40,340	0	0	28,255	0	0	1,396	99,275
	Contra Costa	30	29,758	50	32,564	0	2,462	5,051	0	0	691	70,605
	Marin	0	310	0	10,383	0	0	36,792	875	0	108	48,468
	Monterey	679	252,092	0	266,145	0	0	12	0	26,776	6,641	552,345
	San Benito	0	61,729	0	44	0	0	753	0	0	8	62,534
	San Luis Obispo	1,773	68,413	92	83,636	0	0	25,419	0	31	8,672	188,035
	San Mateo	0	515	0	15,021	0	0	3,089	0	65	1,403	20,093
	Santa Barbara	0	22,548	26,794	170,970	0	0	0	0	197	2,925	223,435
	Santa Clara	52	58,083	110	74,259	0	0	58,888	0	10	3,543	194,946
	Santa Cruz	0	0	0	22,474	0	0	6,362	0	48	0	28,884
	Ventura	61	151	14,427	49,929	0	0	0	0	0	1,179	65,747
Sacramento	Butte	20,042	100,835	31,037	0	0	46,668	4,045	0	5,031	429	208,084
	Colusa	353	112,868	3,342	0	0	167	0	450	0	1,563	118,741
	El Dorado	35,900	46,247	24,591	0	0	90,549	15,893	0	0	3,708	216,888
	Glenn	5,842	83,184	23,385	0	0	23	0	2,755	0	2,626	117,816
	Lake	23,948	90,203	34,348	42	0	3,508	15,013	7,777	1,091	2,126	178,056
	Napa	1,236	62,243	941	5,719	0	6,682	88,715	1,380	12	1,474	168,400
	Nevada	27,129	34,650	12,328	0	0	49,647	2,686	0	84	2,172	128,697
	Placer	35,541	49,754	41,854	0	0	24,333	12,212	0	0	2,709	166,403
	Plumas	18,543	0	11,730	0	0	0	38	0	102	0	30,413
	Sacramento	0	7,254	0	0	0	789	26	0	0	49	8,119
	Sierra	9,200	8	8,512	0	0	8	3	0	79	0	17,809
	Solano	44	17,365	0	2,010	0	848	6,228	0	0	1,074	27,568
	Tehama	24,505	443,003	46,383	0	0	1,973	0	1,069	71	12,238	529,242
	Yolo	0	78,912	61	9	0	1,313	0	0	0	1,155	81,450
	Yuba	10,459	47,733	4,150	0	0	26,186	527	0	1,685	1,384	92,122
San Joaquin	Alpine	612	0	130	0	0	0	0	0	0	0	742
	Amador	9,360	49,802	12,071	0	0	44,813	5,912	0	0	1,631	123,588
	Calaveras	11,729	112,449	26,552	0	0	42,538	860	0	0	235	194,362
	Fresno	15,929	228,915	41,437	0	0	81,779	22,354	0	0	424	390,838
	Inyo	590	0	3,546	0	0	0	25	0	0	0	4,161
	Kern	16,732	153,891	49,437	10	0	73,062	22,822	0	0	7,059	323,013
	Kings	0	9,576	0	0	0	343	111	0	0	0	10,029
	Madera	9,407	124,132	29,844	0	0	98,561	1,896	0	0	2,320	266,160
	Mariposa	12,317	120,825	42,628	0	0	106,607	684	0	0	798	283,858
	Merced	0	50,868	0	2,411	0	5	3,973	0	0	532	57,790
	San Joaquin	0	17,484	0	424	0	437	1,686	0	0	18	20,049
	Stanislaus	0	104,218	0	1,288	0	1,279	1,074	0	0	181	108,038
	Tulare	43,406	157,740	43,210	0	0	67,799	33,504	0	0	256	345,915
	Tuolumne	18,082	72,807	48,071	0	0	72,308	349	0	0	186	211,803
Southern	Los Angeles	1,596	2,487	60,102	30,790	32	351	970	0	0	2,177	98,503
	Orange	0	0	2,419	10,440	0	0	0	0	0	0	12,859
	Riverside	3,248	0	14,207	12,128	2,371	910	172	0	0	0	33,036
	San Bernardino	11,083	0	33,953	2,534	0	538	761	0	0	0	48,869
	San Diego	10,623	0	9,255	74,491	17,964	54	8,515	0	0	0	120,903
	ALL COUNTIES	692,507	3,184,018	1,016,373	930,534	20,367	869,380	738,455	639,449	388,695	85,882	8,565,659

APPENDIX A – TABLE TWO: ACRES OF COVER WHERE OAKS ARE PRESENT IN THE FOREST BY COUNTY AND OAK TYPE

REGION	COUNTY	OAK TYPE										
		Black Oak	*Blue Oak*	*Canyon Live Oak*	*Coast Live Oak*	*Engelmann Oak*	*Interior Live Oak*	*Mixed Oak*	*Oregon White Oak*	*Tan Oak*	*Valley Oak*	*Total Acres*
North Coast	Del Norte	1,344	0	1,611	0	0	0	8,762	948	130,743	0	143,408
	Humboldt	18,556	0	32,777	0	0	0	42,345	43,757	519,090	0	656,524
	Mendocino	39,223	544	33,603	484	0	2,100	39,060	69,662	395,741	0	580,416
	Sonoma	675	0	2,618	3,849	0	29	47,157	7,767	68,488	0	130,583
North Interior	Lassen	2,446	0	0	0	0	0	0	0	0	0	2,446
	Shasta	231,378	5,066	48,675	0	0	93	24	13,894	468	0	299,597
	Siskiyou	32,313	0	180,891	0	0	0	73,999	99,747	85,800	0	472,749
	Trinity	76,489	0	130,061	0	0	0	0	49,701	61,739	0	317,989
Central Coast	Alameda	0	0	0	432	0	0	413	0	0	0	844
	Contra Costa	4	286	98	1,042	0	294	236	0	0	0	1,959
	Marin	0	0	0	118	0	0	15,125	0	2,429	0	17,672
	Monterey	0	229	0	24,421	0	0	6	0	26,414	0	51,069
	San Benito	0	50	0	0	0	0	0	0	0	0	50
	San Luis Obispo	1,542	44	0	1,162	0	0	1,775	0	0	0	4,522
	San Mateo	0	0	0	8,113	0	0	2,347	0	46,577	121	57,158
	Santa Barbara	0	0	13,708	4,813	0	0	0	0	0	0	18,521
	Santa Clara	193	36	0	5,080	0	0	4,271	0	5,911	0	15,491
	Santa Cruz	0	0	0	58,378	0	0	7,473	0	50,895	0	116,746
	Ventura	0	0	27,705	801	0	0	0	0	0	0	28,505
Sacramento	Butte	50,365	3,010	28,510	0	0	4,718	9,460	0	41,470	0	137,533
	Colusa	2,088	193	6,071	0	0	0	0	2,551	0	0	10,904
	El Dorado	59,220	157	16,225	0	0	4,155	7,829	0	100	64	87,750
	Glenn	5,522	75	3,954	0	0	0	0	2,483	0	0	12,033
	Lake	17,725	503	18,082	0	0	214	5,601	5,169	284	33	47,612
	Napa	410	68	512	31	0	0	17,396	159	10	0	18,587
	Nevada	75,680	724	18,602	0	0	4,133	407	0	1,328	67	100,941
	Placer	69,336	146	22,150	0	0	752	8,569	0	0	72	101,025
	Plumas	43,057	0	10,980	0	0	0	146	0	237	0	54,420
	Sierra	29,495	0	12,706	0	0	0	84	0	427	0	42,713
	Solano	0	0	0	0	0	6	0	0	0	0	6
	Tehama	32,200	1,004	16,577	0	0	172	0	2,152	61	0	52,166
	Yuba	24,450	86	5,272	0	0	1,725	648	0	17,245	156	49,582
San Joaquin	Alpine	250	0	90	0	0	0	0	0	0	0	340
	Amador	15,502	0	7,446	0	0	3,115	1,644	0	0	47	27,754
	Calaveras	22,842	0	35,566	0	0	13,537	850	0	0	0	72,795
	Fresno	38,798	2,212	37,285	0	0	1,166	65	0	0	0	79,526
	Inyo	173	0	8,147	0	0	0	0	0	0	0	8,320
	Kern	23,428	818	37,609	0	0	572	947	0	0	53	63,427
	Kings	0	213	0	0	0	0	0	0	0	0	213
	Madera	24,728	37	23,870	0	0	5,249	23	0	0	320	54,227
	Mariposa	35,742	34	26,151	0	0	11,900	44	0	0	92	73,964
	Tulare	37,483	9	14,208	0	0	326	631	0	0	0	52,656
	Tuolumne	37,778	83	41,705	0	0	14,112	31	0	0	25	93,736
Southern	Los Angeles	2,863	306	42,577	464	0	14	60	0	0	0	46,283
	Orange	0	0	919	14	0	0	0	0	0	0	933
	Riverside	2,948	0	32,346	183	0	252	0	0	0	0	35,728
	San Bernardino	46,395	0	35,057	32	0	130	151	0	0	0	81,764
	San Diego	16,302	0	8,390	6,490	0	0	8,654	0	0	0	39,836
	ALL COUNTIES	1,118,940	15,933	982,753	115,906	0	68,762	306,234	297,989	1,455,456	1,050	4,363,023

(FIA) PLOTS IN CALIFORNIA OAK WOODLANDS AND FORESTS 2001-2004

OAK WOODLAND

Oak Type	ACRES	# FIA PLOTS	TOTAL BASAL AREA SQ FT /ACRE	OAK BASAL AREA SQ FT /ACRE	NON-OAK REGENERATION SEEDLINGS /AC	OAK REGENERATION SEEDLINGS /AC	# TOTAL TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE 1-5" DBH	# OAK TREES /ACRE 5-10" DBH	# OAK TREES /ACRE 10-16" DBH	# OAK TREES /ACRE 16-24" DBH	# OAK TREES /ACRE 24-32" DBH	# OAK TREES /ACRE >32" DBH
Black Oak	692507	35	91	39	272	454	382	223	135	72	14	1	0	0
Blue Oak	3184018	244	23	19	31	49	101	81	49	22	7	2	0	0
Canyon Live Oak	1016373	76	77	53	129	190	307	239	128	89	17	4	0	0
Coast Live Oak	930534	79	44	36	94	192	234	136	92	23	15	5	1	0
Engelmann Oak	20367	2	20	20	0	0	10	10	0	0	6	3	1	1
Interior Live Oak	869380	60	42	31	70	135	196	172	110	51	8	2	0	0
Mixed Oak	738455	74	59	37	240	138	154	70	25	22	16	6	1	0
Oregon White Oak	639449	40	68	34	223	144	189	121	73	31	14	3	1	0
Tanbark Oak	388695	20	148	68	615	300	610	292	161	95	30	4	1	0
Valley Oak	85882	4	28	20	0	0	67	44	19	18	6	0	1	1

OAK FOREST

Oak Type	ACRES	# FIA PLOTS	TOTAL BASAL AREA SQ FT /ACRE	OAK BASAL AREA SQ FT /ACRE	NON-OAK REGENERATION SEEDLINGS /AC	OAK REGENERATION SEEDLINGS /AC	# TOTAL TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE >=1.0" DBH	# OAK TREES /ACRE 1-5" DBH	# OAK TREES /ACRE 5-10" DBH	# OAK TREES /ACRE 10-16" DBH	# OAK TREES /ACRE 16-24" DBH	# OAK TREES /ACRE 24-32" DBH	# OAK TREES /ACRE >32" DBH
Black Oak	1118940	70	143	44	689	326	533	200	135	43	17	4	1	0
Blue Oak	15933	2	72	17	712	263	165	18	0	3	12	3	0	0
Canyon Live Oak	982753	65	117	43	344	404	397	196	125	52	15	4	1	0
Coast Live Oak	115906	7	204	39	129	96	334	137	64	57	10	4	1	0
Engelmann Oak	0	NO PLOTS IN THIS TYPE												
Interior Live Oak	68762	8	74	13	1312	347	123	28	9	11	6	1	0	0
Mixed Oak	306234	16	169	46	586	187	456	175	103	48	20	3	1	0
Oregon White Oak	297989	22	82	22	406	174	259	90	51	30	6	2	0	0
Tanbark Oak	1455456	108	173	63	919	293	497	266	169	69	19	8	1	0
Valley Oak	1050	NO PLOTS IN THIS TYPE												

Regional summaries are available at www.californiaoaks.org/Oaks2040.

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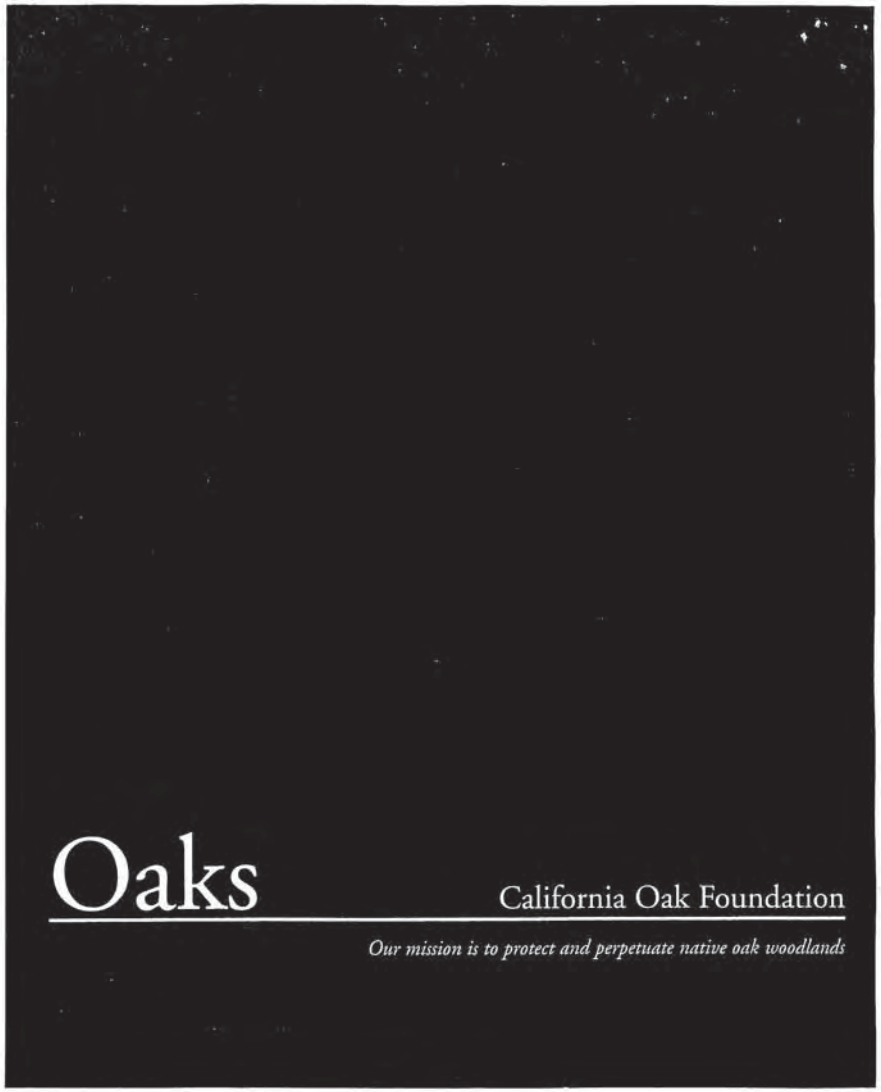
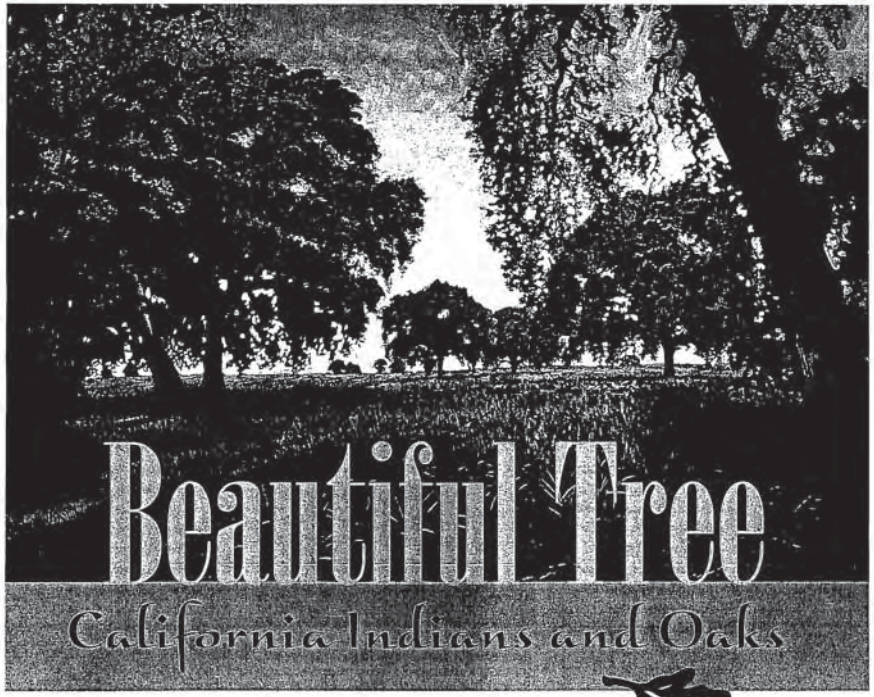




Beautiful Tree

California Indians and Oaks

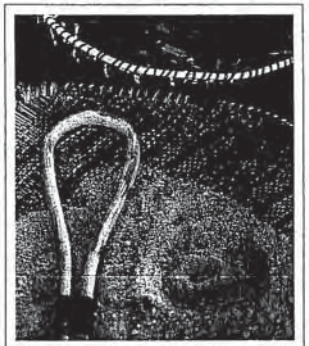
SARA-LARUS TOLLEY

When Europeans first stepped foot in the territory now called California, it was one of the most densely populated areas on the continent. The rich ecosystem was made up of a web of interrelated plants and animals, many of which relied on oaks or acorns to survive. Remnants of the great oak savannahs remain in some parts of the state, but urbanization, agriculture, and grazing have taken their toll. Yet, Native peoples of California still consider the acorn a symbol of the sustenance of their cultures, and today environmentalists frequently turn to the tribes to help build coalitions for the preservation of open space where oaks might spread their branches. One important connection that the tribes emphasize in such struggles is that protecting oaks means protecting sacred areas: village sites, pounding rocks, burial places. Here, respecting Native peoples and respecting oaks go hand in hand. This special supplement celebrates Indian peoples' relationships with oaks, oak-based ecological communities, and acorns. It highlights connection and looks to protection, in the spirit of something Makahmo Pomo basketweaver Elsie Allen once said: "The Indians and the acorn trees are just like the same thing. We wouldn't be the same Indians if there weren't acorns. Far as I know, the acorn trees have always been here and so have we."

In the Pomo language, the word for oak, chiskale, means "beautiful tree."

Kaweah Oaks, oil on canvas, 2004, by Laura Cunningham.

There are twenty species of oak in California and, ecologically speaking, sixty-eight oak communities. Oaks are absent from only the most extreme environments. This means great diversity on a common plan: valley oaks can grow up to 150 feet tall, while the huckleberry oak grows only three or four feet. Botanically, oaks (genus *Quercus*) are divided into three broad groups, apparently distinguished by bark coloring, but in fact distinguished by acorn production: there are white, black, and intermediate oaks. White oaks produce an acorn crop in one year; black oaks take two years. And while the meat of white oak acorns is white, sweet, and palatable, black oak acorns have higher fat content and are yellow in appearance and often bitter with tannins. "Intermediate" oaks are just that—intermediate between white and black. The black oaks are generally the favored species when it comes to harvesting acorns for food. Tan oaks are also favored, and perhaps even preferred. Botanically tan oaks belong to a separate genus and species *(Lithocarpus)* and are thus technically not oaks, but we include them in this supplement on the merit of their tasty acorns and the cultures they have sustained.



Acorn flour ground by Rose Enos (Washoe/Maidu) in a sifting basket by her mother, Lizzie Enos (Washoe/Maidu), at a demonstration at the Oakland Museum. Photo by Dugan Aguilar.

As with all things in nature, oaks have cycles of productivity. Some years are better for acorn than others and thus the diversity of oak species in a landscape is very important. In terms of human use, these cycles of good and bad years mean that the gathering and storage of acorns is a true skill. Along similar lines, tribal leaching technologies were real breakthroughs that made available a nutritional bounty from an otherwise unpalatable and indigestible plant form. As Pavlik et. al. explain, "Depending on the species, acorns can contain up to 18 percent fat, 6 percent protein, and 68 percent carbohydrate (the rest being water, minerals, and fiber). In comparison, modern varieties of corn and wheat have 2 percent fat, 10 percent protein, and 75 percent carbohydrates. Acorns are also good sources of vitamins A and C and many of the essential amino acids" (2002: 76). The contributors to this supplement celebrate the taste and styles of eating such an excellent food source.

California peoples' technological innovations and cultural patterns of using acorn led, in turn, to techniques for leaching buckeye, grinding pinole, and processing other plants. Again and again we'll find that oaks played their part in the bounty of the California landscape in more than the most obvious ways.

For instance, it is worth contemplating the mycorrhizal relationship between oak roots and fungi. Oaks gather water through fuzzy white root coverings called mycorrhizae and the sugars in these root coverings attract fungi that give the oak roots water and minerals. What this leads to

Native Californians and foresters often differ on their views of the tan oak. For Native Californians, the tan oak is a beautiful tree, a source of nourishment and delight; for foresters, it's a tree that usurps land from other trees, grows very quickly, and is generally seen as a scourge. Because of this difference, Native communities and foresters often disagree about which trees to protect and conserve.

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

Letter B2 Attach C

is the production of the delectable *Boletus edulis* (porcini), honey, and other mushrooms!

Further still, the large amount of protein and fat in acorns is more than enough to nourish a wide variety of animals. Mule deer browse extensively on acorns as well as on oak leaves and twigs. And it's not just deer: of California's 169 terrestrial mammals, at least 60 use oak communities and landscapes. Oaks support little mammals—harvest mice, dusky-footed woodrats—and big ones—mountain lions, black bears, even grizzlies back in the day. (Joaquin Miller and many others described young grizzlies dining delicately in tired oak branches, or adults pounding their weight against trees to get the fatty seeds to fall.)

Mary Birchfield (Yurok) blowing ash off a cooking stone that has been lifted from the fire with a cooking paddle. Sumeg Village dedication, Patrick's Point State Park, September 22, 1990. Photo by Beverly R. Ortiz.

Countless varieties of insects are attracted to these trees, too. Oaks host more gall insects than any other native tree in the United States. A gall develops as part of a chemical reaction that occurs when insect eggs (typically wasp eggs) hatch into larvae. These tumor-like growths will be used as food for the larvae so they can make it to their adult stage. Meanwhile, millions of migrating birds are dependent on these same insects that inhabit the oak corridors. (The term "corridor," by the way, might help you visualize the state's remaining oak communities as pathways for animals that, sadly, do not always connect without breaks.) In oak communities, one finds so many amazing creatures: Rare ants. Arboreal salamanders. Western skinks, with their glamorous blue tails, as you'll see represented in one of Bari Talley's illustrations in this supplement. Even common creatures become alluring when their biological story gets told: oaks support communities of acorn woodpeckers, who are cooperative breeders, sharing their granaries as they raise their young in extended families. So dependent are they on their oak environment, the cooperative system breaks down when there are shortages due to the destruction of the many varieties of oak they rely upon. Oaks, you see, are the keystone species in their environments. If they go, the whole interrelated web goes. The point here and throughout this supplement is that when we think of oaks, we should expand our sense of the bounty that they provide.

Again looking to humans and their relationships with these trees, besides the acorns and the animals attracted to the acorns, oaks provide wood for cooking and heating and material for decorative and everyday arts. Oaks also form the basis for creation myths and tribal identities: eating acorn has become a means of internalizing culture and constituting oneself (on a cellular level!) as a California Indian person. And teaching about oaks and acorn is a means of cultural education. Here, culture and conservation come together once again, because a traditional component of the California Indian world view is, in the most general sense, that the bounty of oaks needs to be used to be fully respected. Helen McCarthy has written sensitively about this topic.

> There is a strong interdependence between plants and people. The acorns—and other resources as well—were put here on earth for people to use, for people's survival. The people need the plants in order to live, but the plants also need the people; they need people to gather their seeds, and leaves, and roots, and to talk and sing and pray to them....If plants are not used by people the spiritual relationship is broken, and the plants no longer have a place (1993: 225).

This might offer a way of thinking about such recent scourges as Sudden Oak Death; in answer to the disease, Kashaya Pomo elders have been praying over the tan oaks. This practice of respectful use runs counter to non-Indian ecological perspectives that might put oaks in isolated preserves (like animals in zoos), surrounded by pavement or subdivisions, valued for their beauty alone. The dilemma of the modern world always seems to be a variation on the idea that without flooding, predators, burning, and gathering, the whole system doesn't work as well, but going back to "the way things were" is no longer completely possible. California Indians find themselves enmeshed in these kinds of conundrums and compromises. California's tribes, for instance, strive for a balance of use and protection of resources as they make political decisions about what is best for their communities today. In what follows, readers will find examples of the kinds of political and cultural use decisions tribes have made. What will become clear is that it is not at all hard to find a lifetime of lessons if one takes the time to consider the stories and meanings, histories and botanies, of California's beautiful oaks. ❧

References:

Pavlik, Bruce M., Pamela C. Muick, Sharon G. Johnson, and Marjorie Popper. *Oaks of California.* Los Olivos, CA: Cachuma Press, 2002.

McCarthy, Helen. "Managing Oaks and the Acorn Crop" in *Before the Wilderness: Environmental Management by Native Californians.* Menlo Park: Ballena Press, 1993.

The Heart of the First Oak

In the Maidu creation myth it is declared that the Creator's first act, after forming the dry land, was to cause a great oak tree to spring up, on which grew all the twelve varieties of acorns. Later these different varieties came to grow on different trees. The miraculous tree, however, created by Ko'doyanpe, was still standing, according to old men, at Durham (Ta'doiko) at the time when, in the early 1840s, the first settler arrived. The tree was cut down by him in spite of strong protest by the Indians; and it is declared that the stump bled profusely at the first stroke of the axe, and that in the heart of the tree was found a peculiar substance "like a roll of thin, strong paper," from which the blood flowed. The exact spot at which the tree stood is still pointed out. ❧

Roland B. Dixon. "The Northern Maidu." American Museum of Natural History Bulletin *(1905), 17 (3).*

Maidu Tree of Life, by Dalbert Castro. Photo courtesy of the Oakland Museum of California.

Acorns Were Not Always Bitter

According to Cahuilla oral literature, acorns were not always bitter. At one time, it is said, two powerful shamans had an argument. One of them caused all acorns to become bitter to harm the other shaman. Since that time it has been necessary for Cahuilla to leach their acorns. Another version of the story says that it was the creator-god Mukat who became angry at his people and turned acorns bitter.

Lowell John Bean and Katherine Siva Saubel. Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. *Malki Museum Press, Morongo Indian Reservation: 1979.*

Julia Parker (Coast Miwok/Kashaya Pomo) removing acorn from a leaching basin, Yosemite National Park, c. 1986. Photo by Beverly R. Ortiz.

Story of Oaks

The White Oak *(ahuwham)* had her cap all finished nicely. The Live Oak *(kan'put)* had her cap all finished too. Black Oak *(hansiip)* was making *ashiphanahitch* (a long water-packing basket), and when they said, "Let's go," she put her hat on. That's why it is long. Tanbark Oak was making an Indian basket cap *(ap'xan)* and hers wasn't finished, but she put it on, and that's why the tanbark acorns look so rough.

Ixhareya were the beings before they became trees and rocks.

White Oak and Live Oak laughed at Tanbark Oak and Black Oak, but they retorted, "As long as people live, they will always have us first, and you—they don't think much about you." And that is why, when people are together, they always make tanbark acorn soup and the next they use is black oak.

They laughed at Tanbark Oak because her cap looked so rough, and at Black Oak because her cap was so long.

Mary Ike. In Karuk Myths *by Alfred Kroeber and Edward Gifford. Berkeley: University of California Press, 1980.*

New Caps, by Bari Gayle Morehead Talley.

The Annual Harvest

INTERVIEWS BY SUELLEN OCEAN

Editor's note: In the fall of 2004, Suellen Ocean, author of Acorns and Eat 'Em *and* The Acorn Mouse, *interviewed Native Californians throughout the state about that year's acorn harvest. What follows are excerpts from her interviews with Ronald W. Lincoln, Sr., Julie Tumamait-Stenslie, and Patrick Renick.*

In the west, over the mountains, **Ronald W. Lincoln, Sr.**, was out gathering acorns when I first tried to reach him. Ronald lives on the Round Valley Reservation in Covelo, which is located in Mendocino County. His heritage is Wylackii, Konkow, and Pomo. Ron and members of his family are gathering the acorns this (and every) year from black oak and tan oak trees. The older family members are teaching the young ones. They talk as they gather.

When asked if the places where they gather are ancient, Ron's reply is that

> they are pretty much old, but a lot of the old trees have been cut down or a fire went through there. We are fortunate at Round Valley Indian Reservation; we have a lot of [gathering sites] and we develop relationships with the ranchers. Many will work with us, it's a yearly thing, and we're always looking for new places. The regular spots are sparse; we need new spots. Every other year we go to different sites, they're all mapped out.
>
> We keep up the tradition and share with other folks and barter. We like to have acorns available for gatherings and ceremonies. We make acorn mush and it's served by itself; why spoil it by adding anything to it? It's a natural food. Processed food now is killing everybody.
>
> The trees have a spirit about them; they are living things. That's what we honor. The acorns are a sacred food, and we handle them gently. We crack them and clean them up nice. We are respectful and process them with good thoughts in mind.
>
> We're modern, we use whatever is available, we dry them using cardboard or sacks that we can stick out into the air, or if it's raining we put them by the stove. We try to be quick about it. Acorns, they don't wait for anybody; if we don't gather them up the deer will get them.

Hot Springs Leaching

Hayes (1929:50) reported a variation on the customary leaching technique among the Cupeño at Warner's Hot Springs. He observed them soaking acorn and plum seed in the hot springs. Romero (1954:56) also recorded an alternate processing method in which acorns were put into fine, hand-woven net bags tied with rawhide and placed into a stream. According to Romero, the running water caused acorn shells to split open and released most of their tannic acid. They were then dried and ground into meal.

Lowell John Bean and Katherine Siva Saubel. Temalpakh: Cahuilla Indian Knowledge and Usage of Plants. *Morongo Indian Reservation: Malki Museum Press, 1979.*

Exhibit 6b: City of Oakland Measure DD Implentation Project Final Environmental Impact Report, adopted February 13, 2008

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a valley ripe with acorns
and yellow poppies everywhere
as I lay here
dreaming of you

William Oandasan. Round Valley Songs. *Minneapolis: West End Press, 1984.*

Julie Tumamait-Stenslie is a storyteller from the Chumash nation living "fourteen miles inland, in Ojai, in oak-studded Ventura County," where there are live and coast oak as well as smaller varieties, probably thirty different varieties of oak trees, she said. She has been working as an educator for about sixteen years and knows a lot about her people.

Julie grew up eating a lot of natural foods, but she only started working with acorn about ten years ago. At first she stored the acorns in plastic bags, but she quickly learned not to do this because in plastic bags the acorns retain moisture and go bad. Now she gathers them in plastic bags and transfers them to paper bags so the acorns can dry.

> I had to figure out myself that acorns turn brown after you crack them open. It worried me at first. I also found that after roasting them I cool them and put them in the blender to grind them into flour. Leaching them in the blender, if I only have two or three cups, it works well. I just fill it up with water and pour it off. This way, even if it takes a long time, it makes me feel that I am still doing it the old way.
>
> I try to roast [them] and put [them] in Ziploc bags and stick [them] in the freezer. One by one, I take a bowl and wash them to get all the dirt out and sit in front of my favorite [TV] program or sit outside with my little boy before or after dinner in the beautiful weather and use a rock to crack them. My husband crunches over the shells when he comes home, and the birds—scrub jays—enjoy their share. We have a great cookie recipe and my husband asks, "When does the end product appear?"
>
> There's got to be an easier way than one at a time, but I make myself comfortable. I get a cup of coffee....I work with about six cups of flour at a time, going through different stages. [After shelling I] roast, then blend into a flour, then leach them in a bowl or blender. I use warm water and let it sit. I keep an eye on it and keep going back every half hour. I can get it done in one day. I don't like to boil them; I feel like it boils nutrients out. Once they are leached I spread the flour out onto a tray and bake again in a very low-temperature oven. I love to run my hands through the acorns, it's such a wonderful feeling.

Julie Tumamait-Stenslie, Ojai Day, 2004.
Photo by Jonathan Epstein.

Julie attends the Acorn Festival in Malibu, now in its fourth year, as a storyteller and demonstrator. This year she brought acorns. "The kids stay for almost an hour, cracking and cracking the acorns, twenty kids coming and pounding. There's something very calming, a release of anxiety. The parents say, 'I can't get my kids to leave.'"

Some parents are concerned that acorns could be poisonous. But Julie calmly assures them that the tannic acid is released in the leaching process. She teaches the parents and children that her ancestors learned how to process acorns by watching the animals, who buried them. "I love bringing [our culture] to non-Natives as well as Native children. The public schools are kind of clueless, still teaching history as if we are no longer here," Julie said.

Tribal elder **Patrick Renick,** of the Hopland/Sherwood Pomo Indian Tribe, already has a bucket of tan oak acorns. They're the only ones he gathers. "I'm only sixty-two," he proclaimed, "[but] I don't look my age and don't feel it." When asked if it's the acorns, he said, "Yes, and the seaweed. I gather quite a bit of it."

Born in a hop field in Sonoma County, Patrick said his mom passed away when he was two years old. After that he was raised by Lucy Cooper, his great-great-great-grandmother, who was ninety-eight years old when his mother died.

> We lived on an original dirt floor outside of a makeshift house; we came in the house when [the floor] flooded. We did the acorns as a family thing. My great-great-great-grandfather, Jim Cooper, lived to be 108. I learned everything from them. I didn't speak English, I spoke Northern Pomo.

Patrick is quick to correct himself: "I'd be lying if I said I didn't speak English, because I could cuss good."

Patrick attended the River Union Elementary School in Talmage, near Ukiah. His father, Robert Renick, worked there in the pear orchards as a ranch manager. The family used pear boxes to gather acorns.

> Acorns were a [staple], like wheat, for us. We gathered them on old traditional grounds, usually by the coast. That's originally where we were from; the old people lived way up by Hales Grove, headwaters of the Usal Creek. My Dad would take us up in the farm truck; we had no car. We would drive five hours on a one-and-a-half-lane road.

The road Patrick refers to is the "Willits Road," now Highway 20, a popular road that links 101 to the tourist town of Mendocino, but back then it was "a county road. You couldn't get any speed up, it was mostly gravel and rock; there would be a tree in the middle of the road, we'd have to go around it."

Patrick and his family would pick all day and return home in the evening with three or four 100-pound sacks.

> We'd use regular potato sacks instead of carrying the heavy hop sacks [because] hop sacks are huge. Then we'd empty the potato sacks into the hop sacks. It would take about three hours to pick. Dad was pretty agile and he'd pick fast but the old people were slower.
>
> We made bread and the mush both. We'd crack [the acorns] and let them dry. Kept them dry all the time and then we'd use our mortar to grind them. We'd crack them with rocks [and] before we did that we'd let them dry for a week or so and then we'd put them in a willowing basket, a round, flat basket that was made out of willow or redbud. The husk was like a peanut shell, [and] the wind current would blow the husk away. Then we'd grind it in the mortar.
>
> Today I use a hammer and a thirty-six-inch-high oak stump because I can sit down and do it. If I use a table it will vibrate. It takes about three or four days to crack a 100-pound sack. That's just to crack them. Then I put them in short cardboard boxes and stack [them] in the house by my heater.

To grind the acorns Patrick uses a Cuisinart food processor. "It does two or three cups; it's pretty powerful. Ideally I'd like to get a bread grinder for wheat and things, because I'm trying to get away from the massive work. That's why people don't do it."

Asked about storage, Patrick says, "That's the trick— it's always been really tough [because]

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Letter B2 Attach C

Ishi's Wife

I fell in with a wild Indian once, in the jail at Oroville (my own presence there being entirely voluntary). Everybody was asking him (in various languages and pantomime) if he had a wife, or knew any women. His reply was to put a turnip in his bucket of ice water, let it sink to the bottom, then motion with his finger and say "pup! pup! pup!" Everybody thought he was saying that his wife was shot or drowned crossing a river, but he was describing the boiling of the acorn mush as the women put rocks in it.

T. T. Waterman. "Indians Devote Hard Work to Meal Grinding: Gathering Acorns for Food Is Talk of Women," The Fresno Morning Republican, June 29, 1924. In C. Hart Merriam's papers at the Bancroft Library.

Konkow woman stone-boiling acorn soup near Bidwell Bar, Butte County, c. 1903. Photo by John W. Hudson, courtesy of the California Department of Parks and Recreation.

they'll get bugs, like flour will. So I put four cups in a Ziploc and keep them in the freezer; that way no bugs will get them." As long as the nuts are dry, they can last for two years before being processed.

If he's really hungry for acorns, however, he'll crack, process, and cook the acorns in one day.

> After I grind them, I'll put them in a strainer...and then I'll turn the water on—cold faucet—and let it barely drip for twenty-four hours and it leaches out. Then you can put it in a pot on very low heat like cornmeal mush, stir once in awhile, [and] in twenty minutes turn it off and let it sit. It will set, kind of like a gel, and once it cools down you can eat it at your leisure.
>
> The day after I make it, I have it in the refrigerator and most of the time I eat it cold, put it in a little bowl. Tan oak is the sweetest of them all. But you can eat black oak and white oak too. You can mix them in there.

Patrick likes to bring acorn mush to elders who get hospitalized because "it cheers them up, and it's really palatable."

> When old Indians go into the hospital the first thing they ask is, "You got any acorn mush?" First I used to fight with the doctors and nurses about it. Then I asked them, "Well, if I prove it, will you let me give them the acorns?" And I'd have a piece of paper in my pocket from UC Berkley that broke it down into different compounds, nutrition-wise.

When it comes to calculating each year's acorn harvest, Patrick says, "You never know. I spend a lot of time prospecting for nuts. You have to go along the road and look and see if they are plentiful or not. We can look up into the trees before they drop. It's funny, sometimes [the oaks] go dormant for a couple years. Where I'm going this year, it's loaded, but I can't tell you. It's a secret!"

The Little Acorn

Translated into Yurok by Aileen Figueroa (Yurok) and Barbara McQuillen

kol' wu-nu-auhl kue woo-mehl
long time ago an acorn
There once was an acorn.

chey-ko' woo-mehl
Little acorn
The acorn was small.

o teyn-pey-wehl
It rained
The rain fell.

u skue-soo ta'-u-nok-seehl
Good the weather come
The sun shined.

o hue-nem' kue woo-mehl
Grew the acorn
The acorn grew.

o hue-nem' kue ue'-werr
Grew the root
The root grew.

o hue-nem' ue kaap
Grew a leaf
Then a leaf grew.

kitch nue-mee-pel' kue woo-mehl
Was very big the acorn
The acorn grew more.

hey-won chey-kenee ho'-mo-no'
At first small tan oak
First it was a small tree.

kitch o nue-mee-pel' kue ho'-mo-no'
Was very big the tan oak
Then it grew into a big tree.

ho'-mo-no' kitch oo okw kue woo-mehl
Tan oak was it had the acorn
The tree grew a new acorn.

cho' pen-noo' kue woo-mehl
Fell to the ground the acorn
The acorn fell to the ground.

kol' wu-nu-auhl kue woo-mehl
Long time ago an acorn
There once was an acorn.

chey-ko' woo-mehl
Little acorn
The acorn was small.

Both pages: Illustrations by Bari Gayle Morehead Talley from *The Little Acorn*.

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Letter B2 Attach C

Acorn: An Indigenous Curriculum

The Klamath-Trinity Joint Unified School District's Indian Education Program works to create culturally appropriate books to help students learn English as well as the Hupa, Karuk, and Yurok languages. *The Little Acorn* (2002), written by Sarah Supahan and illustrated by Bari Gayle Morehead Talley (Karuk/Yurok), is a good example. The story, about the cycle of growth, fruiting, and rebirth that is the little acorn's as well as humankind's, is as rich and satisfying as the marvelous illustrations. More information about curriculum and books can be found at www.humboldt.k12.ca.us/kt_usd/K-T/indianeducation/curriculum2.htm.

Author Supahan had this to say about her work:

> When my twin daughters were in kindergarten here in Hoopa, I became aware of the difficulties that unfamiliar curriculum can cause children. I remember one worksheet they were given in which they had to find rhyming words. One word they had to rhyme was "pail"—the thing that we always called a bucket. This totally stumped them because they didn't know what a pail was. Later I noticed the mention of such things as "chutes and ladders," elevators, traffic lights, even animals that were unfamiliar to the children in our area. Of course, the things that our kids know and understand in great detail—food such as acorns—were never mentioned. It was at that point that the idea of making books, videos, and curriculum that would be relevant to our own children took "seed" in my mind, so to speak.
>
> Later I found out that there is sound educational philosophy behind the creation of such materials. As Jon Reyhner wrote, "Culturally relevant materials can provide the critical link between prior knowledge and texts that students read. Such materials are absolutely essential if Indian children are to succeed early in their progress toward literacy" (in *Teaching American Indian Students*).
>
> I originally wrote the story to be included in the Karuk Tribe's HeadStart curriculum. I have a real love for children's books and I particularly like what I call "roundabout" tales, where the story begins and ends at the same place, as it does in this book.
>
> We do sell our curriculum, including the books, throughout the state, although the only marketing we do is to have a website and to occasionally set up a booth at an educational conference. Everything we make through curriculum sales goes back into curriculum reproduction or toward the creation of new curriculum.

Oak Trees: Why Indians Reached the Pinnacle of Greatness

JUSTIN FARMER

Receiving Cradle, *'utuwil*, willow, scrub oak, commercial deerskin, 2000, by Justin Farmer (Ipai).

In this twenty-first-century, we seldom give much thought to the use of native woods, other than that wood is the stuff that holds up most trees, and, if it wasn't for trees, where would we get rubber, or maple syrup, or oranges? Fortunately, there are still a few of us old guys around who think in terms of how it was before J. Serra rested his gimpy leg on a boulder in San Diego circa 1769. At that time the Natives were mostly well and happy, and chainsaws hadn't been invented, so a lot of trees were still standing. Indians used oak trees for a great number of purposes, not just to warm the old tipi (*kish*).

If a twenty-first-century person absent mindedly wandered into a museum and bumped into a showcase of early California Indian things, the most striking feature about many of the artifacts there would be the fairly high percentage of items made of or utilizing oak in one form or another. A close look at the step ladder–style cradle will reveal that oak (often *Quercus agrifolia*) was used for both the vertical frame members as well as the horizontal slats. Almost any wood would suffice but coast live oak seemed to be a bit "warmer" than pine or cedar.

Sitting next to the cradle in that same museum case might very well be a throwing stick, or rabbit stick. To the uninitiated, it might look vaguely like a fat boomerang. This implement was used by California Indian people for hunting and killing small to medium game, and for throwing at people you don't like very much. Our rabbit sticks are usually made of interior live oak (*Q. agrifolia*) or "scrub oak" (*Q. dumosa*). These oaks are used because they are extremely tough and will not break when they come in contact with a deer, a rock, or an enemy's head.

Chances are you won't see an agave stick in a museum, because they aren't real pretty. Agave sticks are about three to five feet long, about two inches in diameter, and are sharpened to a point or wedge at one end, kind of like a crowbar. In the spring, desert-dwelling Indians used the stick to pry the heart from either desert agave or yucca (*Yucca whipplei*). These hearts were then roasted in a pit for several days, which converted the plant's starch to almost pure sugar. Oak was used for the agave stick because it is very durable, and a person surely doesn't want his stick to break when the prying gets tough. When available, oak wood was used in the fire pit because it burns so hot and lasts so long. A very similar stick, although shorter, was also used for digging roots and bulbs from the ground.

In pitifully few museums, a visitor might see a shinny stick, which is usually made of oak. "Shinny" is a very ancient ball game in which a wooden ball was thrown, carried, kicked, or otherwise pushed from one end of a field to another by means of a two-and-a-half- to three-foot-long slender club with a cup on the business end. It was used somewhat like a lacrosse stick. Very frequently, the ball was also carved from an oak burl, usually coast live oak.

Although many woods were used in creating hunting ("long") bows, some of the southern California Indians, notably the Chumash, occasionally used coast live oak. If a bow was to be a short-term thing and a guy had minimal self-esteem, it might be made of soft woods like willow, juniper, or even elderberry. However, where a really nice piece of wood was needed to prove how discerning the owner was, his bow might be made of oak. Then if the showoff really wanted to "put on the dog," he might even use oak as a fore-shaft for his arrows.

For culinary purposes, oak was pressed into service when making a variety of utensils such as food bowls, vessels to carry or preserve fire in, tongs for lifting cooking rocks from the fire to the cooking pot, wooden mortars, and as fuel for an exceedingly hot fire. Oak bark was also used for a wide variety of other purposes. When firing clay pottery, latter-day southern California Indians used cow dung ("caca de vaca") because it burns very hot with little or no flame. In pre-"vaca" days (before Spaniards turned these beasts loose into Indian Country), bark from large, dead oaks was used because it burned even hotter that "caca de vaca." Oak bark is occasionally used today in the dyeing process for basketry fibers. Juncus soaked in a mixture of oak bark and rusty iron or elderberry blossoms or even mud produces a jet-black colorfast dye. If oak bark is unavailable, acorns will also do the trick.

According to Paul Campbell, oak ashes have great undiscovered medicinal qualities, and oak galls are good for the eyes, or even for a physic. Paul can make a musical instrument out of a bunch of acorns strung together, or make a top out of an acorn to amuse your kids, and he says that you can string acorns together to make a necklace for a sweet lady or your wife (or for both), that you can tan an animal skin with tannin extracted from oak bark, that you can set the trigger for a trap or snare with a fat, juicy acorn, and that you can suck tannin from an acorn to clear up a raspy throat or a bad cough. If you want, you can even make a tule doll with a face from an oak gall.

In summary, if you can't find a use for your local oak, you aren't really trying.

It Will Live Forever: Traditional Yosemite Acorn Preparation

Beverly R. Ortiz, as told by Julia F. Parker

For over twenty years visitors to Yosemite National Park have watched with fascination as Julia Parker demonstrates one of the most vital aspects of traditional California Indian life—the Yosemite Miwok/Paiute skill of preparing acorn. In this intimate book, Parker describes every step of this intricate and astoundingly nuanced process.

"A well-researched study that combines history and anthropology...demonstrat[ing] the richness of Indian culture." —*The Californians*

Trade Paper, $13.95
160 pages, with b&w photos, bibliography

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The Children of the Great Oak

WILLIAM PINK

The Great Oak Tree is located on the reservation of the Pechanga Band of Temecula Luiseño Mission Indians. It is considered to be one of the largest and oldest coast live oak trees in the world, although to actually determine the age of the Great Oak would cause it more harm than the worth of the information. It is unfair to describe this marvelous tree, as one should be able to experience it without any preconceptions. A person could simply say that it is big or it is old, but it is more than just that. It is the memory of all that have visited it.

The popular thought among the tree's admirers is that its age is between 1,500 and 2,000 years. Whatever the number might be, this could not compare with the tree's own majesty. It is the Great Oak.

Surviving for hundreds of years through storms, fires, floods, and sometimes abuse from well-intentioned visitors, the Great Oak must someday face the truth of nature as taught to us by the Wiyot. That truth is that someday we must all die. This is said only between thoughts of hope that the Great Oak Tree will survive for another millennia or two.

The Great Oak, like all other forms of life, makes efforts to reproduce itself, sometimes producing as many as ten thousand acorns in a good year. It is from a single seed or acorn that the Great Oak began its journey through life, a feat difficult to imagine when one stands beneath the tree's vast canopy.

Pechanga Cultural Resources is in the process of developing a program that will aid the many acorns produced by the Great Oak Tree to begin their journey and, hopefully for some, achieve the same results. This program is referred to as "The Children of the Great Oak."

The Great Oak Tree of Pechanga. Photo by William Pink.

Despite the tree's prolific production, the program faces challenges. For one, it is impossible to predict the annual seed production of the Great Oak. There are also important decisions that must be made each year: Should we wait until the seeds drop to the ground or should we harvest them while they still hang from the tree? Should we wait until the seeds germinate before removing them from the sheltering canopy of the parent? There are no simple answers.

In the first year of attempting to germinate as many acorns as possible from the Great Oak, the program came to an abrupt halt when ground squirrels either ate or removed more than two thousand seeds from the nursery bed. This was not the end of the program, however. Returning to the Great Oak in early spring, more than five hundred seedlings were retrieved from beneath the canopy and planted in five-gallon nursery containers. More than half survived.

In the second year of the program all the acorns within reach of people standing on the ground were harvested. This time the seeds were planted in a nursery bed with a wire cloth covering to keep out the squirrels. Soon the seedlings were pointed skyward and growing through their protective cover. On the assumption that the seedlings were safe, it was decided to remove the screen.

But again, the squirrels moved in and began systematically removing and eating the seedlings. In response, the height of the nursery bed was raised and the protective screen was replaced, but soon after replacing the screen the seedlings began dying in a spotty fashion. A

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simple tug on a dead seedling revealed that its root had been removed; the gophers had made their presence known.

The Children of the Great Oak program is now in its third year, but not without familiar problems. Time and patience are required. This year there was plenty of patience but not enough time to harvest the desired number of seeds from the tree. The acorns were allowed to drop to the ground.

The Great Oak has hundreds if not thousands of visitors each year. Unknowingly, these visitors were tramping on the acorns and destroying the seed source. With no time to harvest the seeds from the ground, it appeared that the third year of the program would end without a new crop of seedlings.

Yet although the the third year of the program was presumed over, a visit to the Great Oak provided new hope as more than a thousand seedlings had sprouted beneath the tree's great canopy. Closer inspection revealed that the squirrels had hidden the seeds beneath the ground that was gently tilled by God's little tractor, known as the gopher.

From those single seedlings to clusters of six or seven, it became obvious that the squirrel is a major player in the oak's procreation. More than just stashing a seed in the ground, the squirrel revisits each of the seedlings and removes the nut from the new sprout. Some of the seedlings are also consumed by the squirrels, and the gophers take their share as well. The fact is that we would not have a third year program if it were not for the squirrel and his assistant, the gopher.

With this small success, we eagerly wait to see how the seedlings grow.

The United Auburn Indian Community and Development in Clover Valley

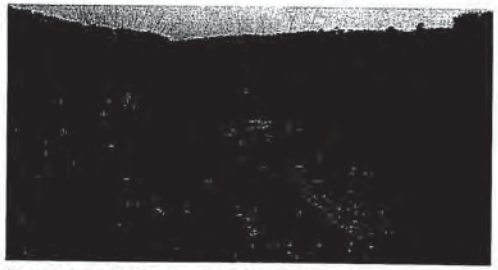
The oaks in Clover Valley, a 622-acre glen located in Rocklin, are stunning in the way that it seems only oaks can be, and the valley's almost hidden location lends itself to a feeling of coming upon an untouched world. Yet touched it is: there are reminders of the large village site that was there in the many grinding rocks, the ball field, and the indications of houses and burial sites. And touched it is, too, by contemporary politics about land use and conservation. The valley is slated for more than six hundred upscale homes, and this development is the subject of much debate.

The nearby United Auburn Indian Community has weighed in on the matter. Tribal Chairwoman Jessica Taveras said that visiting Clover Valley emphasized for her the spiritual connection she and her tribe's members have to the land that is different from non-Indian experiences: "Being at Clover Valley was like finding the Ark of the Convenant." Taveras explained,

> I am both saddened and troubled that the city council is considering a proposed project that would bring more than six hundred homes, five acres of commercial buildings, and a major road to this historical village of the Native peoples of Placer County and a sacred burial place of our ancestors. While I recognize that the issues surrounding the future of Clover Valley are complex, the United Auburn Indian Community urges the council to preserve and protect this pristine jewel of the city.

One of the top priorities for the tribe is preserving cultural sites. The tribe recently committed $25,000 to Placer Legacy, the county's Open Space Preservation Program, to support the program's first year, with additional monies for future years. The United Auburn Indian Community has gone so far as to offer developer Buzz Oates $20 million for the site, but he was not willing to accept this sum. They are hoping to save Clover Valley; if they cannot maybe they can help save another of California's oaken valleys.

Sara-Larus Tolley



Mortars in Clover Valley, Placer County. Photo by Elaine O'Deegan.

Justin Farmer (Ipai) is a retired traffic engineer and self-described "incorrigible collector (and maker) of Mission Indian baskets." He is the author and coauthor of books and articles on cradle boards, deer hunting, and Indian basketry.

Suellen Ocean frequently cooks with acorns and is the author of Acorns and Eat 'Em *and* The Acorn Mouse.

William Pink (Cupeño/Luiseño) is an artist who makes yucca-fiber skirts, bows and arrows, turtle-shell and clam-shell rattles, clay dolls, and abalone-inlaid Cupeño Paviuts, among other things.

Sarah Supahan is the director of the Indian Education Program for the Klamath-Trinity Joint Unified School District and the acting principal of the Yurok Magnet Program at Weitchpec Elementary School.

Bari Gayle Morehead Talley (Karuk/Yurok) is the mother of three girls living on the Klamath River in Orleans. She teaches at the Yurok Magnet Program in Weitchpec.

Sara-Larus Tolley has a Ph.D. in anthropology and has worked on the federal recognition petitions of several California tribes.

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This special supplement was published with the support of the California Oak Foundation, 1212 Broadway, Suite 842, Oakland, CA 94612, www.californiaoaks.org, and is dedicated to Dr. Sam Assam for his support of oak conservation.

Oak trees near Ukiah. Photo by Sara-Larus Tolley.

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Letter B2 Attach C

LETTER B2
California Oaks Foundation
Janet Santos Cobb, President
August 3, 2007

Response B2-1: The comment asks that the City consider the impact on global warming of removing trees. The removal and replacement of trees is described for all project elements in Section III of the Draft EIR, and the potential impacts of the tree removals are evaluated in the Draft EIR in Sections IV.F, Biological Resources. Supporting documentation in the form of an arborist's report is included as Appendix I of the Draft EIR. The project would result in a net increase in trees as described on page 218 of the Draft EIR. The increase in trees would have a positive, albeit very small effect on the global carbon balance by increasing the amount of carbon-fixing vegetation. This positive effect is identified on page 219 of the Draft EIR.

Response B2-2: The City acknowledges the documents attached to the comment letter. The attachments include a summary of a recent lawsuit settlement that addressed global climate change and, in particular, the impact of converting oak woodland habitat to urban land on climate change. However, the Measure DD Implementation Project would not convert oak woodlands to urban land. The project would create additional park land within an urbanized area, which would have a beneficial, albeit very small effect on the global carbon balance by increasing the amount of carbon-fixing vegetation. This positive effect is identified on page 219 of the Draft EIR. The other attachments to the comment letter provide information about the role of trees in natural, cultural, and recently modified landscapes, the Foundation's plan for managing oak woodlands, and the importance of oaks in California's natural and cultural history. These documents do not provide specific comments on the environmental document and the information contained therein does not affect the analysis or conclusions of the Draft EIR.

Letter
B3

From: matt [matt@gaffneylegal.com]
Sent: Friday, September 07, 2007 5:34 PM
To: Thornton, Elois
Cc: briangaf@aol.com
Subject: Measure DD Implementation Project DEIR Comments

Dear Ms. Thornton,

Please find attached one pdf copy of Friends of the Lake's public comments regarding the Measure DD Implementation Project DEIR. This office has also faxed a copy of these comments to the City of Oakland's Community and Economic Development Agency at 510-238-6538.

Please do not hesitate to contact me if you have any questions regarding these comments.

very truly yours,

Matt McFarland

Matt McFarland
LAW OFFICES OF BRIAN GAFFNEY
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Letter **B3** *cont.*

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September 7, 2007

Via Facsimile and Electronic Mail

Eloise Thornton, Planner IV
Community and Economic Development Agency
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Oakland, CA. 94612
facsimile: 510-238-6538
eathornton@oaklandnet.com

RE: Measure DD Implementation Project Draft EIR

Dear Ms. Thornton,

This office represents Friends of the Lake, Nancy Reiser and Ken Pratt (collectively "Friends of the Lake") regarding the City of Oakland's Measure DD Implementation Project Draft Environmental Impact Report ("DEIR.") 1

In summary, this DEIR fails to comply with CEQA because it (1) fails to adequately analyze aesthetic impacts resulting from tree removal; (2) fails to adequately analyze wildlife and biological resources impacts resulting from tree removal; (3) fails to adequately explain how proposed mitigations will reduce project impacts to a less-than-significant level; and (4) fails to adequately analyze cumulative impacts. Further, there is substantial evidence of potentially significant environmental impacts resulting from the proposed project's tree removal. For these reasons, the Draft EIR fails to fulfill the purpose of California Environmental Quality Act ("CEQA") to provide informed public participation and informed decision making. 2

Please continue to include both this office and Friends of the Lake, in any further communications to the public on this proposed project.

Sincerely,

Matt McFarland

cc: Friends of the Lake

Letter
B3
cont.

I. THE DEIR FAILS TO ADEQUATELY ANALYZE AESTHETIC IMPACTS RESULTING FROM TREE REMOVAL.

The DEIR fails to adequately analyze aesthetic impacts resulting from tree removal. A project will have a significant aesthetic impacts if the project will (1) have a substantial adverse effect on a scenic vista; (2) substantially damage scenic resources, including trees; or (3) substantially degrade the existing visual character or quality of the site and its surroundings. (CEQA Guideline, Appendix G; DEIR at 335.) Here, the proposed project will result in the removal of 259 trees, including the removal of 129 protected trees and 8 protected oak trees, around Lake Merritt and the Lake Merritt Channel. (DEIR at 218.) Nevertheless, the DEIR fails to adequately analyze whether the proposed tree removal will result in significant aesthetic impacts. 3

First, the DEIR fails to adequately analyze whether the removal of 259 trees, including 129 protected trees, will adversely affect a scenic vista. The DEIR determines that Lake Merritt and the Lake Merritt Channel are resources that are part of scenic views seen from numerous locations in Oakland. (DEIR at 336.) The DEIR then states that "[t]he project would result in the removal of certain *diseased trees* from the vicinity of the Lake; however, the removal of these trees would not substantially change scenic vistas [because] [n]ew trees would be planted to replace the trees that are removed." (*Ibid.*, emphasis added.) Yet, the DEIR fails to explain why the planting of new trees automatically leads to the conclusion that the project will have a less-than-significant impact on a scenic vista. Given that the DEIR's Arborist Report determines that the trees slated for removal are "generally mature in development," the DEIR's failure to proffer any explanation is a glaring omission. (*See* Appendix I to the DEIR, Executive Summary.) In addition, an EIR must (1) analyze impacts, (2) determine if the impacts are significant, and (3) discuss mitigations. By combining the discussion of mitigations (*i.e.*, the planting of new trees) with the analysis of impacts (*i.e.*, the removal of trees), the DEIR fails to engage in the analysis determination of significance required by CEQA. 4 5

Further, although some of the trees proposed for removal are diseased, the majority of the trees are not. The City's own April 11, 2006 "Tree Permit CEQA Explanation" says that only 31 of the 224 trees proposed for removal in conjunction with the Lakeside Drive (CT05-004), Lakeshore Avenue and El Embarcadero (CT05-005), and 12th Street Reconstruction Project (CT05-006) are dead, severely damaged or represented a significant hazard. (*See* April 11, 2006 Tree Permit CEQA Explanation at 5, 6

Letter
B3
cont.

attached hereto.) Likewise, the Hortscience Arborist Report included as Appendix I to the DEIR concludes in its Executive Summary that, among 269 trees slated for removal, only 6 are dead but 78 are in good or excellent condition. The Arborist concludes that 84 are in "poor condition" but not that they are diseased. Neither the DEIR nor the Executive Summary discusses the remaining 91 trees. Nevertheless, the DEIR limits its discussion to the removal of "diseased trees" and fails to analyze the impact to scenic resources resulting from the removal of healthy trees or trees in good or excellent condition.

6 cont.

Second, the DEIR fails to adequately explain why the removal of 259 trees, including 129 protected trees, will have a less-than-significant impact on scenic resources. Again, the DEIR states that "[m]any of the trees that would be removed are diseased, short-lived, or are not stable," but fails to mention that over half the trees proposed for removal are healthy. (DEIR at 341.) The DEIR then summarily concludes that "[a]lthough some of the trees that would be removed contribute to the scenic quality of the Lake, this contribution is not significant. Therefore, the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources." (DEIR at 341.) The DEIR violates CEQA by failing to explain how it reached the conclusion that the trees slated for removal do not significantly contribute to the scenic quality of Lake Merritt and its surroundings.

7

Third, the DEIR fails to analyze the visual quality impacts to Lake Merritt and its surroundings resulting from the removal of 259 trees, including over 150 healthy trees. The DEIR determines that tree removal will have a less-than-significant impact on visual quality because "landscaping and trees in poor condition would be removed and replaced with new plants that would enhance the visual environment." (DEIR at 342.) Again, the DEIR fails to analyze why it reaches the conclusion that removal of large and mature trees surrounding Lake Merritt and replacement with smaller and younger trees will not adversely impact visual quality.

8

Fourth, numerous commentors have previously stated that the removal of over 200 mature trees around Lake Merritt and the Lake Merritt will result in significant visual quality impacts, and the planting of new trees will not mitigate the impacts. (*See*, *e.g.*, Public Comments on Channel EIR and on Tree Permits CT05-004, CT05-005 & CT05-006, attached hereto.)

9

Letter
B3
cont.

II. THE DEIR FAILS TO ADEQUATELY ANALYZE PROJECT-SPECIFIC WILDLIFE AND BIOLOGICAL RESOURCE IMPACTS RESULTING FROM THE TREE REMOVAL AUTHORIZED BY THE LAKE MERRITT PROJECTS.

The DEIR fails to adequately analyze project-specific wildlife and biological resource impacts resulting from the removal of 259 trees, including 129 protected trees and 8 protected oak trees, around Lake Merritt and the Lake Merritt Channel. (DEIR at 218.) A project will have a significant impact on wildlife/biological resources if the project will have a substantial effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive or special-status species; or (2) interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (CEQA Guideline, Appendix G; DEIR at 210.) 10

Here, the DEIR admits that Lake Merritt and the Lake Merritt Channel support a wide variety of waterbirds, including Barrow's goldeneye, which is considered uncommon in California and is a California Species of special concern. (DEIR at 189.) Likewise, the trees around Lake Merritt provide perch sites and potential nest sites for common raptors such as the red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl. (*Ibid.*) Such trees could also support Cooper's hawk. (*Ibid.*) In addition to Barrow's goldeneye and Cooper's hawk, four other special-status bird species have been observed at or near Lake Merritt and/or the Lake Merritt Channel, including the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, and the Alameda Song Sparrow. (DEIR at 195–96.) 11

The DEIR fails to adequately analyze impacts to each special-status bird species potentially occurring in the Lake Merritt area. The DEIR admits that "numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk," and "[p]roposed tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-skinned hawks by removing trees that *support active nests*." (DEIR at 211, emphasis added.) However, the DEIR summarily concludes that "[i]mplementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-

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skinned hawks to a less-than significant level." (DEIR at 212.)[1] An EIR must (1) analyze impacts, (2) determine if the impacts are significant, and (3) discuss mitigations. Again, the DEIR improperly combines the discussion of mitigations (*i.e.*, implementation of Condition of Approval 32) with a cursory analysis of impacts to the Cooper's and sharp-skinned hawks. By relying on Standard Condition of Approval 32 the DEIR fails to follow the procedure proscribed by CEQA and avoids determining the significance of impacts to special-status bird species resulting from the proposed tree removal. 12

Further, there is no analysis addressing the impacts of proposed tree removal on the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, or the Alameda Song Sparrow, despite the DEIR's admission that these special-status species have been observed at or near Lake Merritt and the Lake Merritt Channel. (DEIR at 195–96.) Thus, the DEIR fails to specifically analyze the impacts to special-status species resulting from tree removal around Lake Merritt. 13

Also, the DEIR does not disclose potential adverse impacts to raptors, such as the red-tailed hawk and red-shouldered hawk. 14

Finally, the removal of 259 trees around Lake Merritt and the Lake Merritt Channel may violate Fish and Game Code section 3503.5, which makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird. Birds of prey in the order Falconiformes include hawks, eagles, kites and falcons. Birds of prey in the order Strigiformes include owls. The DEIR admits that the trees around Lake Merritt provide perch sites and potential nest sites for the red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, barn owl, Cooper's and sharp-skinned hawks, and American Peregrine Falcon. (DEIR at 189.) Thus, the proposed tree removal may result in take, possession and destruction of birds in the orders Falconiformes or Strigiformes (birds-of-prey), as well as take, possession and destruction of nests and eggs of such birds in violation of Fish and Game Code section 3503.5. At a minimum, prior to EIR certification, the City should survey the trees for nests of raptors and owls and disclose this information in the EIR to allow informed decision-making. 15

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[1] The DEIR also violates CEQA by failing to identify and analyze such mitigations, including their feasibility. For example, Condition of Approval 32—which the DEIR includes as a mitigation without identifying it as such—will only be implemented "to the extent feasible." (DEIR at 207.) 16

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cont.

III. THE DEIR FAILS TO EXPLAIN HOW COMPLIANCE WITH THE CITY'S TREE PRESERVATION AND REMOVAL ORDINANCE WILL MITIGATE IMPACTS RESULTING FROM TREE REMOVAL.

The DEIR determines that any potentially significant adverse impacts resulting from the removal of 259 trees—including 129 protected trees and 8 protected oak trees—around Lake Merritt and the Lake Merritt Channel will be mitigated through compliance with the City's Tree Preservation and Removal Ordinance. (DEIR at 218–19.)

The DEIR's determination that compliance with the Tree Preservation and Removal Ordinance will—in and of itself—mitigate potentially significant impacts is contradicted by both the City's Estuary Policy Plan ("EPP") EIR and the Land Use and Transportation Element ("LUTE") EIR, which state that "[a]lthough Oakland's tree removal ordinance requires a permit before large trees are removed, adverse impacts are still possible." (LUTE EIR at III.H.19 & EPP EIR at III.H-6, attached hereto.) Thus, the EPP EIR and the LUTE EIR disclose that compliance with the Tree Preservation and Removal Ordinance does not necessarily mitigate potential adverse environmental impacts. The DEIR fails to explain how compliance with the Ordinance will mitigate potentially significant impacts here. **17**

IV. THE DEIR FAILS TO ADEQUATELY ANALYZE CUMULATIVE IMPACTS.

The DEIR violates CEQA because it fails to adequately analyze cumulative impacts. CEQA requires that the DEIR consider past, present and reasonably foreseeable future projects when analyzing cumulative impacts. (*Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 114; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 720-721; CEQA Guideline § 15130.) This DEIR's cumulative impacts analysis is inadequate because it (1) uses the wrong standard for cumulative impact analysis; (2) completely excludes any consideration of past or present projects; (3) limits its analysis to project-specific impacts; (4) reaches its conclusion of less-than-significant cumulative aesthetic impacts based on the proposed project's "contribution to" cumulative aesthetic impacts; (5) erroneously assumes mitigations for future projects will eliminate potential cumulative impacts; and (6) repeatedly provides conclusions rather than analysis. **18**

A. The DEIR Utilizes the Wrong Standard When Discussing Cumulative Impacts. **19**

CEQA requires that the DEIR consider past, present and reasonably foreseeable future projects

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cont.

when analyzing cumulative impacts. (CEQA Guideline § 15130.) Conversely, this DEIR states that "CEQA allows the use of *either* a list of past, present or reasonably anticipated relevant projects. . . *or* a summary of projections in an adopted planning document." (DEIR at 363, emphasis added.)

The plain language of CEQA demonstrates that a "summary of projections" is a not a substitute for an adequate discussion of cumulative impacts. CEQA distinguishes between a "summary of projections" and an actual analysis of the cumulative impacts of the project together with past, present and future projects. The CEQA Guidelines state that an EIR must include *both* a summary of projections (Guideline 15130, subd. (b)(1)) and an analysis of the cumulative impacts of the relevant projects. (Guideline 15130, subd. (b)(5).) Nevertheless, this DEIR only considers a summary of projection. (*See* DEIR at 363.) While a summary of projection is a proper starting point for a cumulative impact analysis, such a summary—in the absence of any analysis of cumulative impacts—does not provide the substantively meaningful cumulative impact discussion CEQA requires.

19 cont.

B. The DEIR Fails to Analyze Past or Present Projects.

The DEIR fails to analyze any past or present projects in considering cumulative impacts. The DEIR states that its cumulative impact analysis "considered development that is likely to occur under the build-out of the City of Oakland General Plan." (DEIR at 363.) In the areas of Public Services and Recreation, Utilities and Infrastructure, and Aesthetic Resources, the DEIR only considered "buildout of cumulative projects" (Public Services), "other reasonably foreseeable projects in Oakland" (Utilities), and "projects that would be developed as part of General Plan build-out" (Aesthetics). (DEIR at 365–66.) By limiting its analysis to "build-out" and "other foreseeable projects," the DEIR fails to consider past and present projects as part of its cumulative impacts analysis as required by CEQA.

20

C. The DEIR Limits Its Cumulative Impacts Analysis to Project-Specific Impacts.

In the areas of cumulative Transportation, Air Quality, Geology, and Hazards and Hazardous Materials impacts, the DEIR impermissibly limits its analysis to project-specific impacts. In the area of cumulative transportation impacts, the DEIR determines that "the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impacts." (DEIR at 364.) For cumulative Air Quality impacts, the DEIR states that "the project is consistent with the General Plan; therefore the project would not have a significant cumulative impacts." (*Ibid.*) For cumulative Noise impacts, the DEIR determines that "site-specific" noise impacts

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would not result in significant cumulative construction or operational noise impacts. (*Ibid.*) For cumulative Geology impacts, the DEIR concludes that there are no cumulative effects because "the proposed development does not influence or degrade conditions in the area, as long as the impacts of the individual components are reduced to a less than significant level." (DEIR at 365.) For cumulative Hazards impacts, the DEIR concludes that because the "hazards and hazardous materials issues for the proposed project are specific to the individual component sites," there are no cumulative impacts." (*Ibid.*)

21 cont.

In each instance, the DEIR fails to comply with CEQA as it limits its analysis to project-specific impacts and fails to consider the cumulative impact of the project together past, present and reasonably foreseeable future projects. This failure is particularly egregious given that the DEIR recognizes that "Section 15130 of the *CEQA Guidelines* requires that an EIR evaluate potential environmental impacts that are individually limited, but cumulatively significant." (DEIR at 363.) Conversely, this DEIR incorrectly assumes that if project-specific impacts are individually limited, then there is no cumulative impact.

D. For Aesthetics, the DEIR Erroneously Bases Its Conclusion On the Project's "Contribution to Aesthetic Impacts."

For cumulative aesthetic impacts, the DEIR erroneously bases its conclusion of less-than-significant cumulative impacts by determining whether the project will "contribute to" adverse aesthetic impacts. (DEIR at 366.) The DEIR concludes that there will be no significant cumulative aesthetic impacts because "the proposed project would not make a significant cumulative contribution to aesthetic impacts in Oakland and the region." (*Ibid.*) Thus, the DEIR improperly analyzed the significance of the project's contribution to cumulative effects rather than the collective significance of all closely related projects, as required by CEQA.

22

E. The DEIR Erroneously Assumes that Mitigations For Undefined Future Projects Will Eliminate Potential Cumulative Impacts.

In the areas of cumulative Biological Resources, Hydrology and Water Quality, and Hazards and Hazardous Materials impacts, the DEIR erroneously assumes that mitigations for undefined future projects will eliminate potential cumulative impacts. In each instance, the DEIR "anticipates" that "other cumulative projects within the City of Oakland" would be required to implement the same mitigation measures proscribed for the Measure DD projects and, therefore, implementation of the proposed project

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cont.

would not result in significant cumulative impacts. (*See* DEIR at 364–66.) Not only does the DEIR fail to define, identify or discuss what constitutes a "cumulative project within the City of Oakland," but the DEIR also provides no analysis explaining why or how it determined these "cumulative projects" would be required to implement the proposed mitigations nor how these mitigations, if implemented, will reduce cumulative impacts to less-than-significant.

23 cont.

F. The DEIR's Cumulative Impact Discussion Provides Conclusions Rather Than Analysis.

In many of the impact areas contained in the DEIR's cumulative impact discussion, the DEIR provides conclusions rather than analysis. At no point does the DEIR specifically analyze the impacts of the project together with the impacts of past, present or reasonably foreseeable future projects. For example, in the Land Use section, the DEIR states that site-specific impacts "would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts." (DEIR at 363.) This is a conclusion, not the analysis required by CEQA. In the areas of Public Services and Recreation and Utilities, the DEIR concludes without analysis that because the Measure DD Implementation Project together with future development is anticipated in the General Plan, there will be no significant cumulative impacts. Likewise, in the areas of Transportation, Air Quality, Biological Resources, and Hydrology and Water Quality, the DEIR determines less-than-significant cumulative impacts but either provides no analysis that supports this conclusion, or reaches this conclusion based on cursory, project-specific analysis.

24

V. THERE IS SUBSTANTIAL EVIDENCE OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS RESULTING FROM THE PROPOSED TREE REMOVAL.

There is substantial evidence that the proposed tree removal may have a significant effect on the environment. First, there is credible substantial evidence of potentially significant aesthetic impacts resulting from the removal of 259 trees—including 129 protected trees and 8 protected oak trees—around Lake Merritt and the Lake Merritt Channel. The DEIR determines that Lake Merritt and the Lake Merritt Channel qualify as scenic vistas and that the trees slated for removal contribute to the

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scenic quality of Lake Merritt. (DEIR at 336 & 341.) At least 150 of the trees proposed for removal are healthy trees, and the City's own Arborist Report only identifies 6 trees that are dead. (*See* Appendix I, Executive Summary.) Given that Lake Merritt and the Lake Merritt Channel qualify as scenic vistas and given that trees slated for removal contribute to the scenic quality of Lake Merritt, there is substantial evidence that the removal of 259 trees around Lake Merritt and the Lake Merritt Channel may result in significant aesthetic impacts.

25 cont.

Second, there is substantial evidence that the proposed tree removal may result in significant land use impacts. A project may have a significant land use impact if it conflicts with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect. (Guidelines, Appendix G.) The removal of 129 protected trees, including 8 protected trees, will conflict with OSCAR Policy CO-7.4, which "discourages the removal of large trees." (*See* OSCAR Neg. Dec. at 20; *see also* EPP EIR at III.H-6.) Because the proposed removal with conflict with OSCAR Policy CO-7.4, there is substantial evidence of potential land use impacts.

26

Third, there is substantial evidence that the proposed tree removal may result in significant impacts to wildlife and biological resources. As previously discussed, the DEIR itself admits that a variety of native and special-status bird species are found in and around Lake Merritt and the Lake Merritt Channel, including the Cooper's and sharp-skinned hawks, the California Brown Pelican, the Double-crested Cormorant, the American Peregrine Falcon, and the Alameda Song Sparrow. (DEIR at 189–96.) Likewise, the Lake Merritt Channel Wetlands and Widening Project Draft EIR—which purports to analyze the effects of tree removal associated with the 12th Street project—determined that the removal of only 31 Protected Trees from Lake Merritt would have a significant impact on wildlife

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and biological resources. (Channel EIR at 4.1-27, attached hereto.) The DEIR admits that potential tree removal within Lake Merritt and the Lake Merritt Channel could directly impact nesting Cooper's and sharp-skinned hawks by removing trees that support active nests. (DEIR at 211.)

27 cont.

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ATTACHMENT A

Explanation of Environmental Review Completed for Tree Permits
 # CTO5 – 004 Lakeside Drive
 # CTO5- 005 Lakeshore Avenue and El Embarcadero
 # CTO5- 006 12th Street Reconstruction Project

Background and Description of Previous Environmental Review: In 2002, an Initial Study for Measure DD (Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Ballot Measure) was completed, with the finding that the identified potential environmental impacts as a result of the project were within the range and scope of the impacts previously studied in the environmental documentation completed for the General Plan Land Use and Transportation Element EIR, the Estuary Policy Plan EIR, the Open Space, Conservation and Recreation Element Mitigated Negative Declaration and the Coliseum Area Redevelopment Plan EIR.

The California Environmental Quality Act (CEQA) Guidelines Section 15162 requires the Lead Agency (the City of Oakland in this case) to determine whether three conditions are present when applying previous environmental documentation:

1) *Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;*

2) *Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions to the previous EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or*

3) *New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:*

   a) *The project will have one or more significant effects not discussed in the previous EIR or negative declaration;*
   b) *Significant effects previously examined will be substantially more severe than shown in the previous EIR;*
   c) *Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measures or alternative; or*
   d) *Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the proponents decline to adopt the mitigation measure or alternative.*

None of these three conditions were present at the time of the June 2002 Initial Study, given the level of general information and project descriptions known at the time for each of the Measure DD projects. The circumstances under which the projects were to be undertaken were the same as in 2002; funding had been allocated and all policies and programs as set forth in the

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Addendum with regard to standard conditions, construction management and best practices were the same. The water quality requirements and standards under the Regional Water Quality Control Board and Alameda County have been updated, and this represents a more stringent set of standards and requirements for water quality protection and erosion control. The design development process accounted for these changed standards and circumstances and they are not considered significant. Therefore, an Addendum to these documents was prepared and approved by the Oakland City Council in June 2002. Both the Lake Merritt Master Plan and the conceptual plans for the Measure DD Projects (12th Street reconstruction, realignment and other work for Lakeshore Avenue and Lakeside Drive) included tree removal and re-landscaping due to the age and the poor condition of many trees.

Current Review Process and Comparison of 2002 Projects with the Design Development of Construction Documents for the Projects. In 2004, detailed plans and specifications began to be prepared for restoration and improvement of Lake Merritt Park, the 12th Street Reconstruction Project and related access, landscaping and other public improvements. During the next 18 months, three detailed tree surveys were completed, along with a biological assessment (roosting and nesting habitats). Landscaping and revegetation plans were also completed. In addition, public meetings were held and construction plans were revised and altered in order to reduce tree loss. The following table presents a comparison between the 2002 general description and the detailed description for the main components of the three projects under consideration for the tree permit.

Project and Major Components - 2002	*2006 Description as the Result of Completion of Analysis and Design Development Drawings*
12th Street Reconstruction -Replace 12th Street 12-lane viaduct with a new 6-lane boulevard connection to 11th, 12th Street with 1st Avenue, between Oak Street and International Blvd., thereby creating four new intersections – 13th-14th Streets., 12th-14th Streets., 12th Street with Kaiser Center and 12th Street with East 12th Street. -Replace 12th Street culvert at Lake Merritt Channel with an arched bridge to increase tidal flow into and flushing of Lake Merritt. -Repair or replace Lake Merritt retaining walls -Widen Lake Merritt borders and paths to add bike lanes by reconfiguring perimeter streets -Implement system-wide improvements – including paths, restrooms, landscaping and reforestation and signs	**Tree Permit Reference CT05-006** -No substantial changes to those proposed in original project description -Remove approximately 179 trees
Lakeshore - El Embarcadero Modifications -Modify existing El Embarcadero into one road with two-way operation. The unused portion of the roadway would be converted into more parkland. -Widen the Lake Merritt Park borders and paths to add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, Lakeside Drive and Lakeshore Avenue).	**Tree Permit Reference CT05-005** -Lakeshore Avenue modified from four to two lanes plus two bike lanes and a wider park area. -New street section reduces Lakeshore Avenue by approximately 12 feet (similar to what was proposed) -Remove approximately 20 existing trees.

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Municipal Boathouse Renovation and adjacent Lakeside Drive Improvements -Renovation of the Municipal Boathouse with a new accessory building for boat storage, including hazardous materials clean-up. -- -Modification of the parking lot for better access and improved shoreline access. -Modify and reconfigure borders to increase park areas; renovate surrounding areas with new sod and irrigation. -Implement system-wide improvements – including paths, restrooms, landscaping and reforestation and signs. -Narrow a portion of one-way Lakeside Drive from 14th to 17th Streets from four travel lanes to three lanes. Add a northbound bike lane in the segment from 14th Street to 17th Street.	**Tree Permit Reference CT05-004** -Restroom proposed to be outboard of historic structure due to design and public safety reasons. -Remove approximately 25 existing trees.

General Work Signs, compliance with Americans with Disabilities Act and State requirements, minor traffic safety and pedestrian safety improvements as appropriate.	These details were incorporated as part of standard design development work and are required by Federal, State and local laws.

CEQA Review as Part of the Tree Permit Process. Per the requirements of OMC Chapter 12.36 – Protected Trees, three tree permit applications were submitted and the Planning Department reviewed the detailed project descriptions, all information and analysis, including detailed tree surveys, a biological assessment and re-planting plans. A review of the 2002 Addendum was also completed, comparing the new information and analysis with the conceptual plans relied upon for the preparation of the Addendum and the current, more detailed project descriptions. In addition, the currently described projects (above) were reviewed for the three criteria under CEQA Guidelines Section 15162. None of the above-described changes constitute new information that necessitates preparation of further environmental review as specified in CEQA Guidelines Section 15162. Specifically, the proposed lane reduction to the segment of Lakeshore Avenue has been reviewed and the operational levels of service will not significantly change. The 2002 project descriptions called for modifications to the configuration of Lakeside Drive, Oak Street, and Harrison Street. The 2006 project descriptions are more specific and have been developed with more detailed geometric information and traffic engineering information to confirm no greater impact will result.

The circumstances under which the project will be constructed remain essentially the same. Other than infill residential development that was previously projected in the 2002 traffic review, the only major change is the elimination of a previously approved 730,000 square foot office tower located at Grand and Harrison (as part of the Kaiser Planned Unit Development). Instead, the Cathedral of Christ the Light is under construction in that location. The difference in these projects from a traffic standpoint is that there will be a significant reduction in weekday a.m. and p.m. peak hour traffic and a slight increase in Sunday traffic counts. The weekday traffic reduction is considered to be a beneficial change and the Sunday traffic increase is not considered to be significant and will fall well within the weekday peak hour traffic counts. No substantial changes in the project or circumstances under which the project will be undertaken were identified except with regard to the following issue:

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Removal of Protected Trees. The 2002 Addendum states that no removal of protected trees is anticipated. Upon review of the most recent tree surveys, up to 164 protected trees were proposed to be removed.

The results of the tree survey found that many of the trees were in deep distress, with obvious disease, trunk decay, or other vulnerability due to physical condition or age. The detailed tree surveys also confirmed the information and analysis in the adopted Lake Merritt Master Plan (6/02), page III-29, "Many of the Park's trees are at the end of their life span; the age of most forested sections of Lake Merritt is 87 years. Over-mature trees are susceptible to pests and diseases, wind damage and hazardous weakening effects."

Further public meetings, tree survey work and plan revisions were completed. As a result, the following changes were made to the tree removal and re-landscaping plans:

Project Name (Tree Permit #)	**Total Trees proposed to be removed 11/05**	**Current Tree Removal Estimate 1/05** <u>**Protected**</u> **Unprotected**	**Existing trees to Remain (protection measures applied)**	**New trees to be planted**	**Net gain and percentage increase**
Lakeside Drive CT0 5-004	37	<u>20</u>	32	61	41 (79%)
Lakeshore/ Embarcadero CTO5-0005	35	<u>8</u> 17	78	119	94 (91%)
12th St Project CTO5-006	235	<u>136</u> 43	168	341	162 (47%)
Totals:	307	224	278	521	297 (59%)

The Lake Merritt Master Plan sets forth the goal of a comprehensive re-forestation program with the following components: public information, native plant preservation, specimen tree replacement, reforesting high use areas, adequate tree maintenance and reforesting plant communities. The landscaping plans and replanting plans as part of the three projects serve as a major implementation of these goals. There is a significant increase in the number of new trees planted, with a net gain of 297 compared with 224 proposed for removal. Moreover, through the review process, 83 trees originally scheduled for removal were able to be preserved through revisions to the plans. In particular, a grove of redwoods will be preserved as part of the channel restoration for the 12th Street Project. As a result, the new information reviewed in connection with the tree permit application does not yield evidence of new significant impacts associated with the loss of protected trees, nor a substantial increase in the severity of environmental impacts previously studied.

With regard to the potential biological impacts, a survey confirmed that none of the trees proposed to be removed constituted significant habitat value (roosting or nesting). No significant biological impacts will result from removal of the trees.

Given this information and analysis, the Planning Director determined that none of the circumstances necessitating preparation of a subsequent or supplemental EIR are present. Moreover, the three tree permits are exempt from further CEQA review based on the findings set

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forth in OMC 12.36.070 E pertaining to total extent of requested removals and the size of the trees proposed to be removed:

1) The loss of up to 224 total trees (168 protected, 60 unprotected) represents approximately 44 percent of the total trees within the defined project areas for the three tree permits, and approximately 9 percent of the total trees in Lake Merritt Park. Through changes to the plans and the institution of tree protection measures, the number of trees to be removed was reduced by approximately 27 percent or 83 trees.

2) Sufficient preservation efforts have been taken to preserve large trees.

3) Of the 224 total trees proposed for removal, 31 were dead, severely damaged or represented a significant hazard. The remaining 195 trees were identified for removal in order to achieve better drainage and to accommodate foundation work and construction of new stairways and other access features according to federal, state and local standards. In addition, tree removal was also required for retaining wall repair and the realignment of 12th Street.

Reference documents:

2002 Oakland Clean Water, Safe Waterfront Parks and Recreation Trust Fund Addendum

Tree Permit Surveys dated 1/24/06

Picture files of damaged trees and trees near significant park improvements (retaining walls, building foundations)

Plans for the 12th Street Reconstruction Project, El Embarcadero, Lake Merritt Park Improvements, and Lakeshore and Lakeside Drive

Wildlife Habitat Value Assessment, by LSA Associates, dated January 27, 2006

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Garcia, Cecilia

From: Toni Veglia [toni@usenix.org]
Sent: Sunday, January 22, 2006 10:58 AM
To: cgarcia@oaklandnet.com
Subject: Lake Merritt Tree Removal

As a resident and property taxpayer in Oakland, I was shocked to hear about the proposed removal of trees that are not deemed "valuable" to the small group of decision makers. I go by the lake at least three times a week, and I appreciate all of the trees. That a small group of non-elected people can make this decision that negatively affects the quality of life for so many others is absurd. I am not pleased that my taxes are going towards making my city LESS livable instead of more inviting. There needs to be more rather than less greenery in this town. Do NOT cut down the beautiful old healthy trees.

-Toni Veglia
3308 Birdsall Ave
Oakland, CA 94619

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Garcia, Cecilia

From: James Burks [takodi@earthlink.net]
Sent: Saturday, January 21, 2006 8:08 AM
To: CGarcia@Oaklandnet.com
Subject: Destruction of Lake Merritt Trees

Members and Staff

I am in total disagreement with your plans to destroy over 260 trees in the Lake Merritt area. What is the real rational or gain from this action. Many citizens, as you are aware, think the use of funds for this purpose is absurded and not necessary.

Lake Merritt is a beautiful place. Do the right thing by it. Plant more trees and attractions. This city could certainly use. Divert your energy and expertise towards a project more viable. There are so many other major issues and concerns to keep you busy other than destroying a natural and wonderful surrounding.

For instance, in my community near Concordia Park, there are many plans to upgrade, build structures (ie Girls, Inc.) and more. However, I called 615-5566 recently to make you aware of the blight associated with the new tennis and basketball facilities there. I use those fgacilities and would hate to see them destroyed by vandals. As I travel throughout the city, thee are many, many other areas that require your attention, funding and caring to make them better, especially for the kids.

I urge you to redirect and or abort your plans to remove these trees. Have a little love in your heart versus political gain, career advancement, bureaucratic notification. Let them be.

Thank you for your consideration.

James Burks
Citizen

James Burks
takodi@earthlink.net
Why Wait? Move to EarthLink.

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Garcia, Cecilia

From: Kirkwood, Earla, LPRD [EKirkwood810@Worldsavings.com]
Sent: Monday, January 23, 2006 8:11 AM
To: CGarcia@Oaklandnet.com
Subject: TREES AT LAKE MERRITT

My husband and I are sending this e-mail to protest the mass cutting of trees around Lake Merritt. While some trees may require attention, the cutting of so many mature trees will impact both the look and feel of Lake Merritt. As city residents, tax payers, voters and active people who walk around the Lake on a daily basis, we have noticed the red markers on so many trees. Surely, there is a better way to improve Lake Merritt than the mass cutting of so many mature trees.

We agree with the planting of new trees but feel strongly they can exist with the mature trees. Besides chancing the look of the Lake it will seriously impact the eco system in place that provides shade, is a haven for birds and squirrels and in general makes up a part of the "jewel" of Oakland. A win - win situation for Oakland.

Thank you.

Michael J. and Earla D. Kirkwood
2751 Maxwell Avenue
Oakland, Ca 94619

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If you are not the intended recipient of this e-mail, please notify
the sender immediately. The contents of this e-mail do not amend
any existing disclosures or agreements unless expressly stated.
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Garcia, Cecilia

From: Betsy Milligan [betsyjr@sbcglobal.net]
Sent: Saturday, January 21, 2006 2:16 PM
To: CGarcia@Oaklandnet.com
Subject: Concerning Lake Merritt tree cutting

Hello,

I have lived in Oakland since 1975. Of the many reasons I chose this city, one was the beautiful trees. I bought a home here in 1983... that's how much I love this place.

I sadly heard about the plan to cut down trees around Lake Merritt for a varity of reasons. I was horrified at some of the reasons. Some may have merit, however... many of the reasons are just downright stupid.

We live in a disposable society. Most of these trees are older than the people on the City Payroll. What right do you have to cut down a 100 year old tree cause it's in the wrong spot or perhaps... we "plan to put a path there"... ???? New trees can still be planted. But existing ones should be allowed their natural cycles. They create the unique and lovely environment that makes Lake Merritt a jewel of our City.

After all, the very SYMBOL for Oakland is a LARGE OLD TREE!

Staggering the planned cuts is also smarter and healthier.

Obviously... the people planning this have no clue as to the value old trees bring to city.

Betsy Milligan
(510) 531-4409

Opposed

Letter
B3
Attach A

Honora Hunter
310 Lee Street
Oakland, CA 94610

Dan Gallagher, Tree Supervisor
Public Works Agency Administration
City of Oakland
250 Frank H. Ogawa Plaza, Suite 4314
Oakland, CA 94612

1/12/2006

Dear Mr Gallagher:

I would like to express my concern that certain trees around Lake Merritt are due for removal when there is no biological reason for doing so. I do not think that convenience or "tight landscaping" are adequate reasons to remove otherwise healthy mature trees. I understand that the vast majority of the trees slated for removal are diseased or do not have the lifespan to warrant keeping them, however others are perfectly healthy and appropriate for the environment.

The trees that I feel should NOT be removed are as follows:

Tea Trees (Reconstruction of the retaining wall should be engineered AROUND these trees that undoubtedly contribute to the integrity of the soil. I am a local artist, and one of my subjects is the Tea Trees around Lake Merritt.)
LD-26 through LD-28
LD-31 through LD-41
Pines and Poplar (Healthy but not perfectly pruned. I'd rather ugly and natural to perfectly pruned and anal-retentive landscaping.)
LS-65 **LS-89**
LS-95 **LS-101**

Two more comments…I was wondering if it might be possible to move the Magnolias from in front of the Kaiser Convention Center to a location somewhere around the lake, rather than paying to store them or just killing them; also, I was wondering if it would be possible to construct simple (or elegant and artistic) benches from the stumps of trees that are slated for removal. Even one bench made from a stump would be a destination for lake-folk and would be appreciated as a way to preserve some of the history encapsulated by the older trees.
The plans otherwise look pretty good. I'm especially excited about the 12th Street Project. Thank you for considering my requests, and I wish you good luck with your work.

Sincerely,

Honora Hunter
10 year Lake Merritt resident

cc Councilmember Pat Kernighan
Councilmember Nancy J Nadel
Mayor Jerry Brown

Letter
B3
Attach A

1555 Lakeside Drive #167
Oakland, CA 94612-4547
(510) 834-2282

January 16, 2006

City of Oakland
7101 Edgewater Drive
Building #4
Oakland, CA 94621

Attention: Tree Services Section

Tree Services Section Staff:

I moved to Oakland, CA in June 1962 and saw the Australian Tea Trees for the first time which captured my attention and appreciation of their beauty.

These particular tea trees have appeared in many of our photographs over the years and are still special to us.

The 15 trees red tagged along the driveway from 17th street to the former headquarter of the Park and Recreation are all mature and healthy trees.

I was not able to make the lake tour on Saturday, January 7, 2006 but my friend said the explanation for removing the trees is because the equipment used to replace the retaining wall is to large for the space with the trees present.

Please consider removing only every other tree or the ones that cannot be worked around.

Sincerely,

Ronald E. Dudley

Ronald E. Dudley
(510) 834-2282

Enclosures: 4
3 photos
Sunset Garden Book - Page 428

Letter
B3
Attach A

January 6, 2006

JAN 10 2006

Dan Gallagher, Tree Supervisor
Public Works Agency Administration
City of Oakland
250 Frank H. Ogawa Plaza, Suite 4314
Oakland, CA 94612

Dear Mr. Gallagher,

I am writing you as a concerned citizen and Oakland homeowner. In particular, I am asking you to only remove the trees from Lake Merritt that are certifiably diseased and must be taken out as part of the Measure DD Lake Merritt revitalization project.

The most compelling attraction that kept us in Oakland as we searched for our first home was Lake Merritt. The lake itself can range from extremely grimy to clear and inviting, but the old trees, especially the ones near the boathouse, lend a beauty that never wavers. The shade, history, and grandeur of the trees around the lake create an ecological and aesthetic refuge for both humans and wild animals that cannot be recreated with new saplings. I understand that Measure DD is a positive initiative, and current residents must bite the bullet in some cases to make way for future improvements. But I would hate to see valuable trees removed because they are simply in the way of construction. Might plans be altered to accommodate the existence of some of our historic trees?

Please take a measured approach to the tree removal plan and ONLY remove the trees that must be removed because of disease. Oakland residents value these trees and don't want to see something good created at the expense of something else. Please don't turn our lush lake into a barren park that could be Anywhere, USA. Keep the heritage and character of Lake Merritt intact.

Sincerely,

Laura Nor

Chris and Laura Norlander
612 Jean Street
Oakland, CA 94610
510-268-1606

cc: Councilmember Pat Kernighan

Letter
B3
Attach A

OSCAR Action CO-8.1.3:

Limit public access within the Emeryville Crescent, Damon Marsh, Arrowhead Marsh, and Fan Marsh.

OSCAR Action CO-9.1.3:

Support a collaborative effort between Oakland, County, state and federal agencies, adjacent cities, the East Bay Regional Park District, and local environmental groups to develop a long-term multi-species habitat conservation plan (HCP) for the East Bay Hills.

Mitigation Measure H.2: None required.

Special Status Species

Impact H.3: Development consistent with the Land Use and Transportation Element could affect the habitat of certain special status plants and result in the loss of special status plant species, and could result in the loss of mature trees on new development sites. This is a less-than-significant impact due to existing policies in the OSCAR Element.

A small number of undeveloped sites in the Oakland Hills contain Alameda Manzanita, Western Leatherwood, Presidio Clarkia, Uncommon Jewelflower, Tiburon Buckwheat, and Oakland Star Tulip. All of these species are identified as rare, endangered, or threatened by the California Native Plant Society. Although they typically occur on land that is publicly owned, some of these plants may be present on private sites designated for Hillside Residential development. Development consistent with the Proposed Land Use Diagram could result in the direct loss of these plants, or the destruction of habitat suitable for their presence. In all cases, these sites were designated for residential development in the prior General Plan.

The loss of large trees could occur in both hill and flatland neighborhoods as development consistent with the Plan takes place. These could include coast live oak, some of which are very old. Although Oakland's tree removal ordinance requires a permit before large trees are removed, and includes more stringent requirements for the removal of coast live oak trees, adverse impacts are still possible. Impacts to trees could either be direct, through tree cutting, or indirect, through construction, grading, or irrigation changes in their vicinity.

As part of the 1996 OSCAR, the City adopted a series of policies associated with biotic resource impacts. These policies, which are identified below, mitigate this impact.

OSCAR Policy CO-7.1:

Protect native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands, from the potential adverse impacts of development. Manage development in a way which prevents or mitigates adverse impacts to these communities.

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OSCAR Policy CO-6.5:

Protect the surface waters of the San Francisco Estuary system, including San Francisco Bay, San Leandro Bay, and the Oakland Estuary. Discourage shoreline activities which negatively impact marine life in the water and marshland areas.

OSCAR Policy CO-8.1:

Work with federal, state, and regional agencies on an on-going basis to determine mitigation measures for development which could potentially impact wetlands. Strongly discourage development with unmitigatable adverse impacts.

OSCAR Action CO-8.1.2:

Work with the Port to establish buffers or mandatory setbacks on the perimeter of wetlands.

Mitigation Measure H.2: None required.

SPECIAL STATUS SPECIES

Impact H.3: Development consistent with the Oakland Estuary Plan could affect the habitat of certain special status plants and animals and result in the loss of special status plant and animal species. This is a less-than-significant impact due to existing policies in the OSCAR Element.

The loss of large trees could occur as development consistent with the Plan takes place. Although Oakland's tree removal ordinance requires a permit before large trees are removed, adverse impacts are still possible. Impacts to trees could either be direct, through tree cutting, or indirect, through construction, grading, or irrigation changes in their vicinity.

As part of the 1996 OSCAR, the City adopted a series of policies associated with biotic resource impacts. These policies, which are identified below, mitigate this impact.

OSCAR Policy CO-7.4:

Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons

Mitigation Measure H.3: None required.

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Lake and Channel. Habitat enhancements outlined in the Project plans would also attract wildlife, create additional roosting and nesting sites along Lake Merritt Channel, and would better facilitate wildlife movement within and between habitats. The Erosion Control Plan and SWPPP, described in Section 4.1.3 of this EIR and required by RWQCB will ensure that water quality is protected throughout the construction period. Overall, the Project is expected to have a beneficial effect on existing riparian or aquatic resources and would not conflict with the City's Creek Protection Ordinance.

Significant Impacts

Impact BIO-1: Impede the use of native wildlife nursery sites.

There are a number of tall trees on the Project site. These trees provide potential nesting habitat for raptors such as red-tailed hawk, red-shouldered hawk, and passerine birds. The Project would remove 31 trees, many of which are fully mature and provide potential nesting habitat for species of raptors and other migratory birds. Raptors (birds of prey) and most passerine birds are protected under the Migratory Bird Treaty Act. To comply with the Migratory Bird Treaty Act, all active nest sites would have to be avoided while birds are nesting.

> **Mitigation Measure BIO-1:** To avoid any nesting season conflict in construction of the 12th Street, 10th Street, or 7th Street Projects, trees shall be removed before the start of the nesting season (February 15). If tree removal is slated for any portion of the nesting season a biologist shall first conduct a nest survey of the area 30 days in advance of start of work. If no nesting is found to be occurring, work can proceed as planned. If nest activity is found, the biologist shall flag off a suitable non-disturbance buffer area that will remain until the young have fledged. Meanwhile, work outside the buffer area can proceed as planned.
>
> **Significance after Mitigation:** Less than Significant.

LETTER B3
Law Offices of Brian Gaffney
Matt McFarland
September 7, 2007

Response B3-1: The City also received comments on the Draft EIR from Nancy Rieser and Ken Pratt, who are identified in this introductory paragraph of the comment letter. Refer to responses to comment letters B14, B15, and B16.

Response B3-2: The Draft EIR fulfills the requirements and purposes of the California Environmental Quality Act ("CEQA") to provide informed public participation and informed decision making. The Draft EIR describes the Measure DD Implementation Project in Section III, Project Description, including the tree removals associated with each project element. The impacts associated with the project are evaluated in Section IV, Setting, Impacts and Mitigation, where mitigation is recommended, as appropriate. Other CEQA-required analyses, for example cumulative impacts, are included in Section V. Thus, the analysis fulfills the requirements of CEQA and the *CEQA Guidelines*. The specific issues raised by the comment in the introductory statements are addressed below as follows:

- Analysis of aesthetic impacts resulting from tree removal (Refer to Responses to Comments B3-3 to B3-9)
- Analysis of wildlife and biological resources impacts resulting from tree removal (Refer to Responses to Comments B3-10 to B3-16)
- Explanation of how proposed mitigations will reduce project impacts to less-than-significant level (Refer to Response to Comment B3-17)
- Analysis of cumulative impacts (Refer to Responses to Comments B3-18 to B3-24
- Impact analysis for tree removal (Refer to Responses to Comments B3-25 to B3-27)

Response B3-3: The comment introduces points made in comments B3-4 through B3-9. The specific points raised in those comments are addressed in the associated responses. Refer also to Master Response M-1.

As discussed in the Draft EIR the removal of trees will not result in significant impacts to scenic views and resources, or the overall visual character of the project site. The Draft EIR's analysis includes among others the impact discussion in Section IV.M, Aesthetics, of the Draft EIR, as well as: 1) visual simulations of the project from key viewpoints that show the visual effects of tree removal/planting (Figures IV.M-1 through IV.M-4 of the Draft EIR); and 2) a Tree Assessment prepared by HortScience, Inc. (included in the Draft EIR as Appendix I), which evaluates the economic/environ-mental costs and benefits of tree removal and

replacement around Lake Merritt, taking into account the aesthetic value of existing and proposed trees. The discussion in Section IV.M, the visual simulations, and the HortScience study lead to the conclusion that tree removal will not result in a significant impact to visual resources.

The analysis in the Draft EIR of the visual effects of tree removal/replacement fulfills the requirements of *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential effects of tree removal provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B3-4: The comment claims that the Draft EIR "fails to explain why the planting of new trees automatically leads to the conclusion that the project will have a less-than-significant impact on a scenic vista." The stated conclusion–that the planting of new trees would reduce impacts to scenic vistas–is incorrect, and misinterprets the analysis in the Draft EIR. Although the removal and planting of trees has much to do with a site's visual character, it will not have a significant adverse effect on scenic vistas (unless new trees would substantially block scenic views). Visual character is the physical appearance or look of a particular location, including the visual cues that provide a sense of place. Elements that affect visual character in urban locations include the location and coverage of trees, street width, building height and mass, pedestrian activity, the type and size of retail establishments, and amount and configuration of open space. A scenic vista is a notable view of a landmark (such as the view of the Golden Gate Bridge from the Berkeley Marina) or a significant landscape feature (such as views of the East Bay Hills from Lake Merritt).

A significant impact to a scenic vista typically involves the construction or installation of a structure that substantially blocks or changes a scenic view. A prototypical example of such a structure is a freeway that obstructs views of a scenic feature such as San Francisco Bay or the East Bay Hills. Although the planting and removal of trees in the project site will change the visual character of the area, it will not block or substantially adversely change scenic views (including views of Lake Merritt, the East Bay Hills, and other important East Bay landmarks). As noted on page 336 of the Draft EIR, the Group 1 project components would "result in small but beneficial improvements to scenic vistas encompassing" Lake Merritt and the Lake Merritt Channel.

Page 336 of the Draft EIR is revised, for clarification. Refer to Master Response M-1 for revisions made to the text.

Response B3-5: The planting of new trees to replace removed trees is not a mitigation measure, but a part of the proposed project (as described or graphically depicted on pages 30, 35,

38, 41, 42, 43, 47, and 49 of Chapter III, Project Description). Further, the plantings of new trees are conditions of the tree permits. Therefore, discussion of the project's impacts and proposed mitigation is not inappropriately combined.

Response B3-6: The impact analysis in the Draft EIR is not limited to a discussion of diseased trees but also addresses impacts associated with the removal of healthy trees. As noted on page 341 of the Draft EIR, "As part of the project, certain trees would be removed (and replaced with healthy individuals). Many of the trees that would be removed are diseased, short-lived, or are not stable." The Draft EIR analyzes impacts associated with the removal of healthy trees, but notes that many of the trees that would be removed are unhealthy or unstable. According to the Tree Assessment prepared by HortScience, over 70 percent of the trees to be removed are dead, or in "poor" or "fair" condition.

Response B3-7: Page 341 of the Draft EIR is revised to further discuss why the removal of trees will have a less-than-significant effect on scenic resources (and visual character). This supplemental text provides additional details about the analysis that was performed to support the conclusions of the Draft EIR, which are unchanged. Refer to Master Response M-1 for text revisions.

The project also includes the rehabilitation of three historic structures around Lake Merritt: the Pergola, Cleveland Cascade, and the Boathouse. This rehabilitation would be undertaken in a way that avoids significant impacts on the historic qualities of the building facades and would enhance these scenic resources. Therefore, this group of project components would have a less-than-significant effect on scenic resources.

Response B3-8: In the case of the Group 1 projects, which would all be located around Lake Merritt and Lake Merritt Channel, impacts to "scenic resources" (the Lake, Channel, and adjacent lands) are essentially the same as impacts to "visual character" (the visual perception of the Lake Channel, and adjacent lands). Refer to Response to Comment B3-7 and Master Response M-1 for an explanation of why the removal of trees from around Lake Merritt and the replacement of these trees with new trees will not result in a significant impact to visual character (or scenic resources).

Response B3-9: The comments submitted by other individuals regarding impacts associated with tree removal are noted. As discussed in Response to Comment B3-7, the removal of trees will have a relatively small visual impact when considered in the context of trees to be preserved within the site and the 521 new trees that will be planted as part of the project. This conclusion is supported by a tree economic/environmental valuation study conducted by HortScience, which determined that within 5 years of planting, the replacement trees will be more valuable in terms of aesthetics and other environmental/economic benefits than the existing trees that will be removed as part of the project. Refer also to Master Response M-1.

Response B3-10: See responses B3-11 through B3-16, which respond to comments raised regarding the Draft EIR's analysis of wildlife and biological resource impacts associated with tree removal. Refer also to Master Response M-1.

Response B3-11: Based on a review of pertinent information (e.g., the California Natural Diversity Database for the area and communications with a local birder) the Draft EIR finds that the only special-status species with potential to nest in the taller trees at Lake Merritt is Cooper's hawk (sharp-shinned hawks are not known to nest in urban areas; they were included in the Draft EIR because suitable nesting habitat is present in the Oakland Hills, where several Measure DD-funded creek restoration projects are proposed). The Draft EIR identifies this *potential* impact at the bottom of page 211. It should be noted that to date, no Cooper's hawks have been observed nesting in any of the trees to be removed. Likewise, no other raptors or owls, including the five species identified by the comment (red-tailed hawk, red-shouldered hawk, American kestrel, great horned owl, and barn owl) have been observed nesting in any of the trees.

For the purposes of the environmental analysis, an impact to Cooper's hawks or other raptor would be considered "significant" if a nest were destroyed during tree removal activities or a pair of raptors abandoned a nest due to human-caused disturbance (e.g., excessive construction noise). As discussed below (Response to Comment B3-16), the City's Conditions of Approval are considered part of the project when determining whether a given impact is significant. The potential impact to nesting Cooper's hawks (and any other birds) would be avoided through the implementation of Condition 32 (i.e., preconstruction surveys and establishment of nest buffers), which has been incorporated as part of the project. Thus, the potential impact is not considered significant.

There are no potential impacts associated with tree removal on Barrow's goldeneye, California brown pelican, double-crested cormorant, American peregrine falcon, or Alameda song sparrow. The trees that will be removed as part of the project, and trees in general, are not an important habitat component for the species as explained in the following paragraphs.

Barrow's goldeneye is a species of diving duck that winters in the Bay Area in small numbers. The species spends all of its time in open water while foraging and resting. Trees are not an important habitat component for this species.

California brown pelicans at Lake Merritt spend nearly all their time resting on or foraging over open water, and are not known to roost in trees. Double-crested cormorants may occasionally roost in trees near the water's edge, but prefer to roost along the shoreline, on docks, or on pilings. None of the trees around the southern end of Lake Merritt represent important roost sites for the lake's cormorant population, which is concentrated more towards the northern end of the lake near the islands adjacent to the Rotary Nature Center. Furthermore, the Species of Special Concern designation for double-crested cormorant only applies to known rookeries, one of which is present at the above-mentioned islands. None

of the trees to be removed support a cormorant rookery.

Trees are not an important habitat component for urban peregrine falcons, which perch almost exclusively on human-made structures (e.g., tall buildings, bridges, transmission towers). Furthermore, peregrines are not a regularly occurring species at Lake Merritt (see Draft EIR page 195). Because peregrines (1) do not perch or nest on trees in urban landscapes and (2) only occur sporadically at Lake Merritt, they will be unaffected by tree removals.

Similarly, Alameda song sparrows do not roost or nest in trees. They are adapted to the open tidal marshes that surround San Francisco Bay, and are thus dependent on low-growing pickleweed and other dense vegetation for nest sites rather than open-branched ornamental trees such as those around Lake Merritt. As such, tree removals will not impact this species.

Response B3-12: The City's Uniformly Applied Development Standard Conditions of Approval are incorporated into projects as explained on pages 64-65 of the Draft EIR and are considered part of the project when determining the significance of a given impact. As such, the City's Conditions of Approval are not mitigation measures. If an impact is less than significant with the Conditions of Approval that are incorporated into the project, no mitigation is proposed. Because the Conditions of Approval are not mitigation measures, consideration of the Conditions of Approval in the impacts analysis of the Draft EIR does not inappropriately combine the analysis of impacts with the discussion of mitigation.

The Draft EIR follows CEQA procedures by analyzing the impacts of the project. Preconstruction surveys for and avoidance of, active nest sites are part of the project and ensure that the impact is less than significant. Thus, no mitigation is proposed.

Response B3-13: Refer to Response to Comment B3-11.

Response B3-14: Potential impacts to the nests of common birds, including red-tailed and red-shouldered hawk, are identified on page 213 (third paragraph) of the Draft EIR. Because preconstruction surveys are incorporated into the project (Condition 32 of the City's Conditions of Approval, included on page 207 of the Draft EIR) the tree removals will not result in significant impacts to nesting birds. The impact would be less than significant with the implementation of Condition 32 because tree removals will occur outside of the breeding season when nesting birds are not present (as was the case for the trees removed in November along Lakeside Drive and Lakeshore Avenue), or if tree removals occur within the breeding season, the trees will be surveyed for nests and if any are found steps will be taken to ensure that the nest(s) are not disturbed until the young have successfully fledged.

Response B3-15: Implementation of Condition 32 from the City's Conditions of Approval (which is incorporated as part of the project) will ensure that tree removals will not violate the Fish and Game Code. The EIR team's ornithologist disagrees with the

comment's assertion that the City should survey the trees for nests of raptors and owls prior to EIR certification. To avoid impacts to nesting raptors and owls, it is essential to survey the trees *at the time of the proposed activity* (i.e., within 15 or 30 days during the breeding season, as per Condition 32) to ensure that no nests are present. Surveying the trees a year or more in advance may provide information as to which trees are being used by raptors and/or owls, if any, but would be of little help in avoiding impacts since most birds vary in their nest placement from year to year. The practice of conducting preconstruction surveys immediately prior to tree removal is a standard avoidance and protection measure that has been implemented on many other similar public works projects, as well as in General Plans, and is regularly accepted by the CDFG as an appropriate mechanism for the protection of nesting raptors, owls, and other native birds.

Response B3-16: Refer to Response to Comment B3-12 for additional information regarding the City's use of its Uniformly Applied Development Standard Conditions of Approval.

The phrase, "to the extent feasible," which is cited in a footnote to comment B3-12, qualifies only a portion of Condition 32 cited by the comment. The relevant section of Condition 32 reads: "To the extent feasible, removal of the trees and other vegetation suitable for nesting or raptors shall not occur during the breeding season of March 15 through August 15. *If tree removal must occur during the breeding season* [emphasis added], all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. …" The measure provides more than one way to reduce adverse effects to nesting birds—either remove trees outside of the nesting season or, survey and avoid active nests if the work must be conducted during the nesting season. As either approach required by Condition 32 avoids adverse effects to nesting birds, no mitigation is required.

Response B3-17: The comment incorrectly states that the EIR determines that compliance with the Tree Preservation and Removal Ordinance will—in and of itself—mitigate potentially significant impacts…" This statement confuses the evaluation of an impact with mitigation. The impact that is being evaluated on pages 218-219 of the Draft EIR is whether the project would fundamentally conflict with the City of Oakland Tree Preservation and Removal Ordinance (see page 210 of the Draft EIR for the complete text of the criterion of significance used to evaluate the impact). For the reasons presented in the first paragraph at the top of page 219, the EIR concludes that the project would not conflict with the ordinance and thus no mitigation is required. Note that other potential impacts associated with tree removal are addressed on pages 211-212, 336, and 341 of the Draft EIR. Refer to Master Response M-1 and Responses to Comments B3-3 to B3-16 for additional discussion of impacts and mitigation associated with tree removal.

Response B3-18: The EIR's analysis of cumulative impacts is adequate. Please see Responses to Comments B3-19 through B3-24. The specific points raised in those comments are addressed there and in the associated responses that follow.

Response B3-19: The Draft EIR first identified the method for estimating the universe of cumulative development (i.e., past, present and probable future projects) and then analyzed that development's potential cumulative impacts.

CEQA allows lead agencies to choose the method for establishing the cumulative projects or projected levels of cumulative development that is best suited to the situation at hand. As the comment notes, the City considered a summary of projections to establish past, present and probable future development. Because the proposed project implements many of the open space, recreation and land use policies described in the City's General Plan and analyzed in previous planning level documents, the City finds the method selected is the one best suited to the situation. The projections account for past and present projects as well as future probable development. In addition, the cumulative analysis considered specific projects, including the Oakland Whole Foods Market, the Jack London Square Redevelopment, and the Oak to Ninth Avenue Projects (page 133 of the Draft EIR).

Having established the cumulative development scenario to be examined for a project of the scale and type proposed here, the City analyzed that development's potential compound impacts. While the comment states that "…'a summary of projections' is not a substitute for an adequate discussion of cumulative impacts", suggesting that the summary of projections is claimed by the EIR to be the equivalent of the analysis of potential cumulative impacts, nowhere does the EIR suggest such a substitution. In fact, following the subsection on Methodology (revised below) the cumulative analysis is conducted over the next three pages (Draft EIR, pp. 363-366) for each of the topics evaluated in the main Setting, Impacts and Mitigation Measures chapter of the Draft EIR. It is in that text – a paragraph or two for each topic – that the cumulative analysis required by CEQA is conducted and presented.

Refer to Response to Comment B3-24 for additional response to the comment on the analysis of cumulative impacts. The text on page 363 of the Draft EIR is revised as follows to clarify the EIR's choice of the summary of projections and approved projects:

1. Methodology

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present and reasonably foreseeable future projects ~~or reasonably anticipated relevant projects~~ (including projects outside the control of the lead agency) or a summary of the projections in an adopted General Plan or related planning document. This cumulative impacts analysis considered development projections that are contained in ~~is likely to occur under the build-out of~~ the various elements of the City of Oakland General Plan, including the Land Use and Transportation Element (LUTE), and the Open Space, Conservation, and Recreation Element (OSCAR), and their related environmental review documentation. The projections account for past and present projects as well as reasonably foreseeable future development. In addition, the cumulative analysis considered specific projects, including the Oakland Whole Foods Market, the Jack London Square Redevelopment, and the Oak to

Ninth Avenue Projects. As a result, the analysis is based on a projections approach, which has been refined by including additional information regarding specific existing and anticipated future projects.

Response B3-20: The cumulative analysis of the Draft EIR included consideration of past, present and probable future projects. Past and present projects are included in the term "build-out" in the context used on page 363 of the Draft EIR and thus were considered in the cumulative impacts analysis. Refer also to Response to Comment B3-19 for revisions to the text to clarify the methodology of the cumulative analysis and to Response to Comment B3-22 for a discussion of the cumulative analysis for aesthetics. The text beginning at the bottom of page 365 of the Draft EIR is revised as follows to clarify the discussions of Public Service and Recreation and Utilities and Infrastructure.

j. Public Services and Recreation. ~~Development of t~~The proposed Measure DD Implementation Project~~, in conjunction with planned future development as anticipated by the City's General Plan~~, would incrementally increase demand for police and fire services as noted in Section IV.K, which finds that the project sites are currently adequately served and the impacts on demand would be less than significant. For recreation, the analysis finds that service is currently inadequate, as the City does not meet its goals of 10 acres of total and 4 acres of urban parkland per 1,000 residents. However, the project would improve recreational facilities and increase the current ratios by constructing new facilities in East Oakland and by increasing the acres of parkland around the south end of Lake Merritt. Thus the project would have a beneficial effect on recreation. Therefore, the cumulative analysis focuses on police and fire services. ~~public facilities and services. However, none of the public facilities or services analyzed would experience significant impacts or create demand beyond that anticipated in the General Plan.~~

There is no evidence that the demand for police and fire services would be cumulatively significant because adequate fire and police service is provided to the project area and development under cumulative conditions would be addressed by the service providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. Build-out of the cumulative projects would not result in cumulative impacts related to physical capacities, service levels or funding availability, particularly because the increased demand for services has, in many cases, been anticipated in planning and policy documents and would be shared across service areas within the City. In addition, given the acceptable levels of service as described in Section IV.K, the demand by the project when combined with past, present, and reasonably foreseeable future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. As a result, no significant cumulative impacts would result.

k. Utilities and Infrastructure. The proposed Measure DD Implementation Project is located in areas already served by utilities and the incremental increase in demand for services would not require the expansion or construction of new facilities. The cumulative increase in demand on the utility providers and infrastructure in the City resulting from implementation of Measure DD, in combination with past, present and other reasonably foreseeable projects in Oakland, is anticipated

within the General Plan as well as within plans prepared by each of the utility providers to address projected growth.

There is no evidence that the demand for utilities and infrastructure would be cumulatively significant because adequate service is provided to the project area and development under cumulative conditions would be addressed by the utility providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. In addition, given the acceptable levels of service as described in Section IV.L, the demand by the project when combined with past, present and reasonably future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. Therefore, no significant cumulative impacts would result.

Response B3-21: The cumulative impacts discussion focuses on effects that could cause cumulatively considerable impacts when combined with the effects of past, present, and probable future projects. The analyses are not site-specific but encompass a geographic area appropriate to the area of potential cumulative effect, such as the air basin for air quality but appropriately smaller areas for other topical areas, such as noise, geology and hazards. Refer to Response to Comment B3-23 for revisions to the Hazards and Hazardous Materials analysis. Refer to the end of Chapter IV of this Response to Comments document for additional revisions to the cumulative impacts analysis in Section IV.C, Transportation, Circulation, and Parking, of the Draft EIR. The cumulative analyses for Transportation, Circulation, and Parking, Air Quality, Noise, and Geology, Soils and Seismicity found on pages 363-365 of the Draft EIR are revised as follows:

b. Transportation, Circulation and Parking. A detailed analysis was conducted for the purposes of assessing cumulative environmental impacts to the transportation system as described in Section IV.C. As described therein (see pages 133 to 134), the cumulative analysis analyzed the project in combination with past, present and reasonably foreseeable future projects. The cumulative analysis identified five significant cumulative impacts related to transportation (TRAF-5 through TRAF-9), three of which are identified as significant and unavoidable because they may not be reduced to less-than-significant levels. The impacts and mitigation are discussed in detail in Section IV.C. No significant impacts were identified for alternative modes of transportation. The project would not fundamentally conflict with adopted policies, plans, or programs supporting pedestrian and bicycle transportation or transit use. The project would improve both pedestrian mobility and bicycle transportation. Although travel times would increase as a result of the project and affect some transit routes, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Thus, the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impact.

c. Air Quality. As noted in the air quality impact analysis in Section IV.D, the air basin within which the City of Oakland and the project components lie is non-attainment for ozone, PM_{10} and $PM_{2.5}$. As such, the project and other past, present and reasonably foreseeable future projects could

result in an impact that is cumulatively significant for air quality related to these pollutants. However, the City finds that the project's contribution to the impact would not be cumulatively considerable and thus the impact is less than significant. According to the *Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines*, any proposed project that would individually have a less-than-significant air quality impact and is consistent with the General Plan, where the General Plan is consistent with the Clean Air Plan, would be considered to have a less-than-significant cumulative air quality impact. The Measure DD components would not have significant operational air quality impacts, therefore a determination of the cumulative impacts would be based on an evaluation of the consistency of the project with the City of Oakland's General Plan and of the General Plan with the regional air quality plan. As discussed in Section IV.D, tThe City of Oakland's General Plan is consistent with the 2005 Ozone Attainment Plan, the fourth triennial update of the Clean Air Plan, and the project is consistent with the General Plan;. In addition, the project would not generate objectionable odors, expose sensitive receptors to substantial air pollutant concentrations, or emit toxics that would contribute to a cumulative impact. Likewise, the project would not contribute to an impact associated with CO concentrations because CO concentrations would not increase as a result of the project. Ttherefore the project would not have a significant cumulative impact.

d. Noise. As noted in the noise analysis in Section IV.E, tThe project components are primarily recreational facilities and water quality improvements that would not produce substantial noise during their operation and would not contribute substantially to the cumulative noise environment, which would generally include the project site and surrounding properties. Further, the noise impact analysis in Section IV.E notes that the primary source of noise in the project area is and would be motor vehicle noise. The analysis of cCumulative traffic noise impacts for all project components, as shown in Tables IV.E-12 and IV.E-13 and in the discussion under Section IV.E.2.b, was based on the cumulative traffic volumes (i.e., cumulative plus project scenario) generated for the traffic analysis in Section IV.C, which included the project and other past, present, and reasonably foreseeable future ~~planned~~ projects within the City of Oakland. The analysis demonstrates that the cumulative noise impacts from traffic would be less than significant for noise sensitive receptors within the City of Oakland.

There would be temporary construction noise impacts and one of these (i.e., pile driving) ~~that~~ would be significant if noise-reducing measures specified in the City's ~~Standard and~~ Uniformly Applied Development Standard Conditions of Approval are not feasible (as noted in Section IV.E). ~~However~~If they occur, these impacts would be limited to sites around Lake Merritt, namely the E. 18th Street Pier, the 12th Street reconstruction area and Lake Merritt Channel, and a few segments of the Waterfront Trail ~~site-specific~~ and limited to the duration of construction period. Except as noted with respect to pile driving, there is no evidence that noise levels would be cumulatively significant. The noise levels in the project area are within the City's standards for noise and because construction projects in the cumulative scenario within the City of Oakland are required to comply with the City's Noise Ordinance and Conditions of Approval. ~~Thus,~~ The requirements will render cumulative construction noise and operational noise impacts ~~would be~~ less than significant.

h. Geology, Soils and Seismicity. The area of cumulative effects for geology, soils and seismicity issues, such as liquefaction, landslides, lateral spreading, expansive soils, landfills, and septic systems, is the project site. ~~The geologic, seismicity, and soils conditions of this site are specific to the individual component sites. Other sites in the vicinity may have similar issues and concerns regarding geological conditions and hazards.~~ For geologic, seismicity, and soils issues, the proposed

development does not influence or degrade conditions in the area of cumulative effects, because among other reasons, ~~as long as~~ the impacts of the individual components are reduced to a less than significant level by the California Building Standards Code and the City's Uniformly Applied Development Standard Conditions of Approval with which the project will be required to comply. In addition, many features of the project, such as improvements to trails, creeks, landscaping, and water quality, do not create any hazards. Others, such as renovations of the Studio One Art Center, the Municipal Boathouse and the Pergola, would reduce existing hazards by strengthening existing structures. These actions would not contribute to a cumulative impact and, in the case of renovations would have net beneficial effects. New structures associated with past, present and reasonably foreseeable future projects as well as the current project, such as the East Oakland Sports Complex, would be built to current seismic codes ensuring that potential seismic hazards are less than significant. Thus, the project would not make a cumulatively considerable contribution to a cumulative significant impact related to geology, soils or seismicity.

Response B3-22: The cumulative analysis for aesthetic resources in the Draft EIR is consistent with CEQA and the *CEQA Guidelines*. The analysis considers both whether there is a significant impact to which both the proposed project and other projects contribute and whether the project's incremental contribution is cumulatively considerable. *CEQA Guidelines* Section 15130(a) states that: "An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant." The project's contribution to the cumulative aesthetic impact of past, present and probable future projects is clearly less than significant in light of the City's finding of the project's many benefits on visual resources. As discussed on page 366 of the Draft EIR, the proposed project would have beneficial effects on the visual quality of Oakland by renovating open space around Lake Merritt, restoring historic landmarks, improving water quality, constructing trails in shoreline areas, and restoring creeks. Therefore, the project's contribution to adverse impacts to visual resources associated with the implementation of other projects in Oakland is less than cumulatively considerable and thus not significant.

Response B3-23: The Draft EIR does not rely on mitigation of future projects to "eliminate potential cumulative impacts." The analysis considers both whether there is a significant impact to which both the proposed project and other projects contribute and whether the project's incremental contribution is cumulatively considerable. Further, for Biological Resources, Hydrology and Water Quality, and Hazards and Hazardous Materials, which are cited in the comment, the project would not have significant cumulative effects because generally the project's effects are beneficial. Indeed, it is among the project's objectives to improve water quality and habitat for fish and wildlife (page 24 of the Draft EIR).

For Hydrology and Water Quality, the Draft EIR finds that the project would reduce flooding, improve water infiltration and groundwater recharge, and improve water quality. In addition, the project includes measures to protect water quality during construction and project operation as described in Section IV.H.2.b of the Draft EIR. Nevertheless, as noted on page 260 of the Draft EIR, Lake Merritt is an impaired water body due to organic enrichment, low dissolved oxygen, and trash

and the Estuary and San Francisco Bay, to which Oakland's creeks flow, are impaired for pesticides, dioxins, furans, PCBs, selenium, mercury, and exotic species. Thus, the contribution of the project and other past, present and probable future projects could result in an impact that is cumulatively significant for water quality. However, the project's contribution to the impact would not be cumulatively considerable for two reasons: 1) with the exception of organic nutrients, the project would not generate the contaminants for which the water bodies are impaired and 2) the project would likely reduce organic nutrients due to the net decrease in impervious surface around Lake Merritt and the Best Management Practices (BMPs) that are included in the project (e.g., grassy swales, porous pavements, and stormwater planters). Thus, the cumulative impact of the project is less than significant, as stated in the Draft EIR. The text on page 365 of the Draft EIR is revised to clarify the explanation of the cumulative impacts analysis as follows:

g. Hydrology and Water Quality. The majority of Measure DD components would be constructed in an urbanized area of Oakland and would not significantly increase impervious surface coverage or result in flood hazards within the component sites. In fact, several Measure DD Project components would include measures to improve water quality.

Construction and operational-period impacts to stormwater that would result from implementation of the Measure DD Project would be minimized through compliance with the Water Board's regulations and implementation of the City's Standard Conditions of Approval. Nevertheless, as noted on page 260 of the Draft EIR, Lake Merritt is an impaired water body due to organic enrichment, low dissolved oxygen, and trash and the Estuary and San Francisco Bay, to which Oakland's creeks flow, are impaired for pesticides, dioxins, furans, PCBs, selenium, mercury, and exotic species. However, the EIR analysis shows that the project's contribution to the impact would not be cumulatively considerable for two reasons: 1) the project would not generate the chemical contaminants for which the water bodies are impaired and 2) the project would likely reduce organic nutrients due to the net decrease in impervious surface around Lake Merritt and the Best Management Practices (BMPs) that are included in the project (e.g., grassy swales, porous pavements, and stormwater planters). Thus, the cumulative impact of the project is less than significant. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same water quality maintenance measures and would not result in cumulative adverse impacts to water quality. Therefore, implementation of the proposed project would not result in significant cumulative hydrology and water quality impacts.~~

For Hazards and Hazardous Materials, the Draft EIR finds that the East Oakland Sports Complex would store a hazardous material, sodium hypochlorite (i.e., bleach); that commonly used hazardous materials, such as paint, fuels and adhesives, would be transported and used during project construction; and that the reconstruction of 12th Street would temporarily close a designated emergency evacuation route. None of these would result in a significant cumulative impact when the project is considered with past, present and probable future projects as explained below.

Hazardous materials transport, storage and use would be cumulatively significant if the project and cumulative projects created a significant hazard to the public or the environment within the area of cumulative effect (i.e., the project construction sites, the East Oakland Sports Complex site, or roadways to these sites). The cumulative effect would create a significant hazard to the public if the hazardous materials in the cumulative scenario exceeded regulated quantities or resulted in the improper use or storage of hazardous materials. The storage of common hazardous materials in accordance with State and federal regulations and the City's Best Management Practices by the project in combination with past, present, and probable future projects would not create a significant cumulative hazard to the public or the environment. Thus, the cumulative impact would be less than significant.

For emergency evacuation routes, the area of impact would be the areas served by 12th Street, the evacuation route that would be temporarily closed during construction. During the period of project construction, other projects in the cumulative scenario could have street closures that would affect the same areas, which could constitute a cumulative impact. However, the proposed mitigation requires the review and approval of the temporary detour plans by the City's Office of Emergency Services, which would be aware of all closures in the City, and would ensure that the project's contribution is less than cumulatively considerable because it requires that alternative routes are identified and available during project construction. Because the project's contribution to the cumulative impact is not cumulatively considerable the impact is less than significant. The text on page 365 of the Draft EIR is revised to clarify the explanation of the cumulative impacts analysis as follows:

i. Hazards and Hazardous Materials. The hazards and hazardous materials issues for the proposed project are specific to the individual component sites and would not lead to any cumulative impacts related to hazards. Most components of Measure DD would not store or use substantial quantities of hazardous materials and would, at some sites, help ensure that potential chemical hazards in soil or groundwater are remediated and the risk from these hazards is reduced. ~~Some hazardous materials would be stored for maintenance and disinfection purposes at the proposed East Oakland Sport Complex. As all such storage and use in the City of Oakland must comply with State and local regulations for hazardous materials, this would not have a significant cumulative impact.~~

Hazardous materials transport, storage and use would be cumulatively significant if the project and cumulative projects created a significant hazard to the public or the environment within the area of cumulative effect (i.e., the project construction sites, the East Oakland Sports Complex site, or roadways to these sites). The cumulative effect would create a significant hazard to the public if the hazardous materials in the cumulative scenario exceeded regulated quantities or resulted in the improper use or storage of hazardous materials. The City finds that storage of common hazardous materials in accordance with State and federal regulations and the City's Best Management Practices by the project in combination with past, present, and reasonably foreseeable future projects would not create a significant cumulative hazard to the public or the environment. Thus, the impact would be less than significant.

For emergency evacuation routes, the area of impact would be the areas served by 12th Street, the evacuation route that would be temporarily closed during construction. During the period of project construction, other projects in the cumulative scenario could have street closures that would affect the same areas, which could constitute a cumulative impact. However, the proposed mitigation requires the review and approval of the temporary detour plans by the City's Office of Emergency Services, which would be aware of other closures in the City, and would ensure that the project's contribution is less than cumulatively considerable because it requires that alternative routes are identified and available during project construction. Because the project's contribution to the cumulative impact is not cumulatively considerable the impact is less than significant.

For Biological Resources the project's contribution to the cumulative impact of past, present and probable future projects is less than significant in light of the finding of the project's many benefits to wildlife, habitat quality, and water quality. As discussed on page 364 of the Draft EIR, the proposed project would have beneficial effects on the biological resources of Oakland by increasing open space and improving water quality. Other benefits are identified in the project description and therefore, the project's contribution to adverse impacts to biological resources associated with the implementation of other projects in Oakland is less than cumulatively considerable and thus less than significant. The text of the Biological Resources section on page 364 of the Draft EIR is revised as follows to clarify the explanation of the cumulative impacts analysis:

e. Biological Resources. Project activities are not anticipated to make a cumulatively considerable contribution to ~~have~~ a cumulative significant impact on biological resources. The project would generally be conducted in an urbanized area and would increase open space and improve water quality, which would benefit wildlife. Other benefits include establishing foraging and refuge areas by restoring native vegetation, restoring wetlands, and removing exotic invasive vegetation, providing greater diversity of habitat, and improving connectivity between Lake Merritt and similar habitat areas within the area. Potential temporary impacts to wildlife, such as nesting raptors and songbirds~~,~~ during construction, injury to fish during pile driving, or disturbance of wildlife in the Channel by small boats, and impacts to waters of the U.S. and State ~~of some project components were identified, but these would be mitigated~~ would be avoided (impacts to wildlife and fish) or fully compensated for (impacts to waters of the U.S. and State) by the City's Conditions of Approval or by the mitigation measures recommended in this EIR. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same protective measures for biological resources and would not result in cumulative adverse impacts to wildlife. With implementation of the mitigation measures~~Because the potential impacts to biological resources would be beneficial, avoided, or fully compensated for, the project's incremental contribution would not be cumulatively considerable and the impact would be less than significant.~~fully mitigated and no cumulative effects to biological resources would result from this project~~.

Refer to Response to Comment B3-19 for additional discussion of cumulative projects used in the analysis.

Response B3-24: The EIR provides analysis as well as conclusions in the discussion of cumulative impacts. The example provided in the comment for Land Use cites the conclusion of the impact analysis but excludes the preceding text that provides the analysis and

rationale for the conclusion. As stated in the cumulative impact analysis for Land Use, the proposed land uses associated with the project are compatible with surrounding land use. They are also compatible with uses proposed in the General Plan. The only potential land use conflict (and significant impact) is a site-specific safety issue associated with one property along the Waterfront Trail. This would not have a cumulative impact when considered with past, present, and future probable projects. To clarify the City's basis for its findings page 363 of the Draft EIR is revised as follows:

a. Land Use. The majority of the Measure DD components would renovate or improve existing structures, recreational facilities, roadways, and creeks within the City of Oakland and would not change land use. New land uses would include roadway and park changes associated with Lake Merritt~~,~~ and the creation of new parks and installation of the new trail connections associated with the Waterfront Trail~~, and the construction of the East Oakland Sports Complex.~~ With one exception, t~~T~~he proposed land uses associated with the project would be compatible with the ~~surrounding~~ land use and zoning of the project site and surrounding neighborhood, which is the geographic area of potential cumulative effect for land use impacts. ~~One~~ The potential land use conflict, a potential safety hazard that would be created by constructing the trail across an operating industrial facility, was identified for the Waterfront Trail group. ~~, which~~ This impact would be reduced to a less-than-significant level with implementation of the identified mitigation measure. The EIR analysis shows that the impact would not be cumulatively considerable for two reasons: 1) there are no other similar safety impacts to which the impact would contribute and 2) the residual effect would be eliminated by the proposed mitigation measure. Thus, the project ~~This site-specific impact~~ would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts.

Analysis is provided on pages 363-364 of the Draft EIR for the other topical areas cited in the comment. The Transportation, Circulation, and Parking section, for example, includes a detailed analysis of cumulative impacts (Section IV.C), which is cross-referenced in Chapter VI. Refer also to Responses to Comments B3-20 (Public Services and Utilities and Utilities and Infrastructure), B3-21 (Transportation, Circulation, and Parking), and B3-23 (Biological Resources and Hydrology and Water Quality).

Response B3-25: The comment claims that there is substantial evidence that tree removal would have a significant effect on the environment. In the case of the Measure DD Projects, recognizing a divergence of public opinion on this matter, the City determined that tree removal associated with the project could result in significant impacts to visual resources. Therefore, the City decided that this issue (among others) would be addressed in an EIR. Subsequent to the publication of the Draft EIR the Alameda County Superior Court confirmed the City's prior analysis of no significant impacts (see Master Response M-1). Moreover, as discussed in the Draft EIR and in Response to Comment B3-7, tree removal will not result in a significant aesthetic impact. The evidence supporting the conclusion in the Draft EIR that tree removal will not result in a significant impact on aesthetic resources includes the following items:

- Many of the trees that would be removed are diseased, short-lived, or are not stable (i.e., they are dead, or in poor to fair condition), and detract from the visual environment of Lake Merritt and Lake Merritt Channel;
- Approximately 510 trees would be retained within the project area.
- Trees would be planted as part of the project (521 in total, creating a replacement ratio of almost two trees for every removed tree) and these new trees would enhance the visual character of the site;
- Visual simulations prepared for the project (refer to Figures IV.M-1 through IV.M-4 in the Draft EIR) show that tree removal would have a less-than-significant impact on visual character and scenic resources; and
- A tree economic/environmental valuation study conducted by HortScience determined that within 5 years of planting, the replacement trees would be more valuable in terms of aesthetics and other environmental/economic benefits than the existing trees that would be removed as part of the project.

The claim that tree removal will result in significant effects to the visual quality of Lake Merritt and its surroundings fails to give due consideration to both short-term and long-term environmental impacts as mandated by *CEQA Guidelines* Section 15126.2. As shown in the HortScience tree valuation study in Appendix I of the Draft EIR and the visual simulations, the project would result in positive aesthetic, environmental, and economic effects in the long-term. Refer also to Master Response M-1.

Response B3-26: The policy cited in the comment discourages (but does not prohibit) the removal of large trees. The project would preserve many more existing large trees than will be removed, replacing each removed tree with approximately two new trees. The flexibility of the policy cited by the comment (indicated by the word "discourage") suggests that the policy be interpreted in the context of other, competing General Plan policies, including Policy OS-6.4, which directs that Oakland's lakes be managed to take advantage of their recreational and aesthetic potential while conserving their ecological functions and resource value. The project would accomplish these objectives and it is consistent with the City's General Plan policies for improving recreation and open space areas and creating new recreational opportunities for residents of Oakland. In the context of other, competing General Plan policies, the project would not directly conflict with the policy referenced in the comment and the impact would be less than significant.

Refer to Response to Comment A1-14 for additional discussion of conformance with the City's General Plan.

Response B3-27: See Response to Comment B3-11 for a discussion of potential impacts of tree removals on individual species of birds.

The analysis and conclusions of this EIR are consistent with the Lake Merritt Channel Wetlands and Widening Project EIR. The Lake Merritt Channel Wetlands

and Widening Project *did not include* preconstruction surveys or other requirements to avoid impacts to active nests that are found. Thus, the Lake Merritt Channel Wetlands and Widening Project EIR identified the impact on nesting raptors and other migratory birds as significant and prescribed preconstruction surveys and nest buffers as mitigation to avoid or reduce the impact to a level that is less than significant. The Measure DD Implementation Project *includes* preconstruction surveys and nest buffers as part of the project. Thus, impacts to nesting raptors and other birds will be avoided and were found to be less-than-significant in the Draft EIR. The surveys and buffers that reduced the impact to less than significant for the Lake Merritt Channel Wetlands and Widening Project (via mitigation) have been incorporated into the Lake Merritt Implementation Project. After the surveys are conducted and the nest buffers are implemented, as needed, the outcome with regards to the level of significance is the same for both projects; the impact would be less than significant.

Letter
B4

From: RBishop747@aol.com
Sent: Tuesday, September 11, 2007 3:17 PM
To: Thornton, Elois
Cc: RBishop747@aol.com
Subject: Measure DD Draft EIR Responses
Dear Ms. Thornton:

I went to City Hall yesterday to deliver the document and meet with Mr. Lindheim of the Mayor's Office. He informed me that any documents due on Monday were postponed until today.

Attached you will find a short list of concerns that should be addressed in the Measure DD Draft EIR. I was unable to review the entire document with the time constraints and my own work load.

Thank you for the opportunity to participate in the way Oakland will move forward.

Sincerely,

Ron Bishop - Architect - AIA
Bishop Architecture
Bicycle Safety Instructor - LCI
[510] 652-4667

See what's new at AOL.com and Make AOL Your Homepage.

Letter
B4
cont.

RON BISHOP - ARCHITECT
409 45th Street - Oakland - CA - 94609 - (510) 652-4667 E-Mail: rbishop747@aol.com

Eloise Thornton
Measure DD Draft EIR
Case # ER06-0017
City Of Oakland

Comments:

Overall the allotted time would have been sufficient except that the document was released when many citizens were on vacation. I know personally that many of the Measure DD Committee members were not aware that the document was released or was even in the works. If the Measure DD Committee did not know then there would be many citizens that were not aware. **1**

The EIR Document is not a green document [to big and bulky] or user friendly [inadequate wayfinding]. It seems to be assembled in a great hurry, without sufficient thought. It is difficult to read and lacks wayfinding. It also has a conglomeration of various letters from citizens that are to small to read and many of the elements of the letters have been deleted because of poor placement on the page. There is much extraneous information and it is difficult to ferret out the necessary information. **2**

Page 10
Proposed reconfiguration of El Embarcadero and its potential impacts on nearby Lakeview Library

The plan did not fully identify the issues early on for Lakeview Library. Though there will be significant improvement over the existing transportation infrastructure for the area, the present solution has not have given sufficient weight to the solitude of Lakeview Library or the safety of pedestrians and cyclist. The visual, physical and acoustical disconnect between Lakeview Library and Lake Merritt remains or worsens. Provide sound mitigation for the Lakeview Library. **3**

There will be extra cost incurred to expand the lane width to 12 feet from the existing 11 feet on this one block section adding to the continuing cost overruns. The curb removal and reconstruction will further encroach on Lakeview Library by several more feet. Suggest we maintain the existing curb width. **4**

Another issue is the lack of coordination between county and city agencies. The county recently repaved lakeshore Avenue and El Embarcadero and we will pay again to have the city do the job. **5**

Page 11
Significant Unavoidable Impacts:
Santa Clara Ave./Grand Ave, MacArthur Blvd./Grand Ave., and Lake Park Ave./Lakeshore Ave.
The City of Oakland needs to plan these areas for the future and make them all be the best they can be for all modes of transportation. The failure to mention Lakeshore Ave./ MacArthur Blvd. indicates the loss of another chance to do the job right once. The local community is working on several of these intersections, but cannot seem to get Oakland employee engineers to get serious about the pedestrian and bicycle issues. The only determining benchmark considered is LOS, level of service for motor vehicles and not other users. Keep the motorist flowing. **6**

Page 15 [not listed]
Bay Place & Grand Ave. Intersection.
This intersection is in dire need of improvement for all users. Pedestrians and cyclist are often in peril attempting to cross or use Bay Place from Grand. The slip turn needs to be removed and the intersection should be like a standard ninety-degree intersection. This was discussed over 8 years ago when Grand Avenue was under renovation to add the bike lanes. **7**

Letter
B4
cont.

Page 15 [not listed]
Bellevue at Grand [entry to Lakeside Park].
This is one of the worst intersections for pedestrians and cyclist. It is difficult to cross Bellevue as it is extremely wide and has a high speed turn incorporated into the existing design. This intersection should be retimed to allow seniors and mothers with children to cross Grand without running out of walk time. The requirement for a pedestrian to push a button in order to actuate the signal is repugnant and should be addressed. A well-designed intersection could improve the access to Children's Fairyland and improve accessibility by removing the existing steps or by adding an alternate ramp route from the intersection. The existing, well worn, dirt path could provide some insight. **8**

Page 25
Oakland Waterfront Trail and Access Improvements [Group 2] Improve pedestrian and bicycle circulation.
This topic should include a full analysis of trail paving materials. The analysis should include, recycled content, durability, ease of repair, initial costs, CO2 emissions generated by the product, and the ability to absorb shock as the pedestrian runs or walks on the trail, which will lessen the wear and tear on the body. **9**

There is also no mention on the placement of bike racks, benches, refuge containers, toilet facilities, or water replenishment.

"C" EIR Scope:
Waterfront trails does not mention pedestrians or bicycles. **10**

Page 29
Remediate Hazardous waste
Seek ways to use permaculture techniques to remove toxins from the soils, rather than the often-proposed soil removal, haul away to another place, pave over [encapsulate], and bring in new soil. That is not true remediation but instead is an attempt to bury past mistakes. **11**

Page 30
Kaiser Convention Center Parking
The new configuration of the parking should take into consideration the features of the building and include space to enjoy the wonderful art displayed on the Kaiser Convention Center by Calder's renditions in the niches. **12**

The parking lot should be designed to save as many of the existing trees as reasonably feasible, rather than the perfectly linear strip mall approach. Other trees might be moved with the equipment I recently shared with Oakland planners. **13**

Intersections
The intersections of 12th, 13th and 14th Streets to Oak Street should be carefully analyzed to ensue pedestrian safety, not only the typical LOS approach. Measure DD was passed to improve pedestrian and bicycle accessibility as well as improve Lake Merritt and other waterfront access. Oak Street should be modified to calm traffic rather than enhance speeding opportunities. **14**

Plantings
The plantings should be natives in general, keeping non-natives to a minimum. Trees that are high in allergens that cause allergies should be kept to a minimum. Species should be easy to maintain and should be adaptable to the environment of Oakland. Avoid the formal garden approach in Lake Merritt designs. Lake Merritt is a naturalized park, with many different species from many places. A formal approach with row upon row of same plantings would not fit in with the existing and would detract from that natural feeling. **15**

Existing trees should be properly trimmed, treated and maintained until they have actually reached end of life.

Figure III-2
The dead end of Lakeshore with no bicycle access to 12th Street is incomplete. It would be better to allow the cyclist to reach 12th Street rather than force them to use the Pedestrian/Bicycle bridge. This would reduce conflicts and reduce the traffic the pedestrian/bike bridge would have to carry. **16**

Page 35
10th Street Bridge
No complete drawings for the project have been submitted for review to the Measure DD Committee or the BPAC. Drawings and details must be submitted and agreed upon prior to bridge construction beginning. 7th Street will need new bike lanes to enhance travel for Laney Students and improve access to the various nearby DD areas. **17**

Letter
B4
cont.

Page 41
Lakeshore Avenue.

Pedestrian safety does not score as well as motorist movement. Islands of refuge are only considered if they will not inhibit motorist speed when making a turning movement. The issue is still in debate at the "DD" Committee Meetings and a positive response will improve the plan as it was intended to improve the human experience. **18**

The slip turns have been removed from Lake Merritt perimeter except for the intersection at E. 18 St./Lakeshore Ave. This will make Lake Merritt safer for pedestrian crossings. The only remaining slip turn is being held to in a very tenacious manner. Lets remove this slip turn, re-connect the three redwoods with the community and improve pedestrian safety at this intersection.

Page 41
3] Cleveland Cascade
This was not originally part of Measure DD, but was later added. **19**

4] El Embarcadero
With dwindling resources and insufficient funds allotted overall, we should keep the curbs where they are and save the money for other projects. Eleven foot lanes will fit between the existing curb, be sufficient for the one block of travel distance, and save money in grading and new concrete work. **20**

The project has not resolved how to allocate space for cyclist afraid to ride in the roadway with motorist. This needs to be answered. **21**

5] Pergola and Colonnade
Install bike racks, benches, refuge containers and remove the steps that impede access. **22**

Figure – III-8
Boathouse Parking
For the record, there was also a bid to increase parking in Lakeside Park in 1969 that was defeated by the citizens of Oakland. I am still appalled that the park should be turned into a parking lot to provide parking for a vendor. **23**

Page 48
Cessation of bird feeding at Lake Merritt.

This was never a part of Measure DD. This is a new attempt to address the fact that Lake Merritt is the home of the worlds first Wild Life Sanctuary and now some of the birds are considered a problem. **24**

Figure – III-9
Boathouse Grand Staircase
Do I hear ADA lawsuit looming in the near future. The side paths do not provide equal access. Staircases stop strollers as well as wheelchairs. I am glad we relocated the parking further from the water, but we still have to many and there is not an apparent charge for the parking. **25**

Page 52
Estuary Park
This portion of the plan should follow the Estuary Plan created by Oakland citizens over many years, not be sold to the developer of choice. **26**

Many other issues are on this page. General Trails.

I believe that the city should be open to accepting new pavement materials. Rubber sidewalks is one and SofTrail is another product that would be more appropriate for pedestrian travel. Given the existing two choices I would recommend use of asphalt. It is half the price and is more comfortable [resilient] on the foot. Concrete also releases one ton of CO_2 for every one ton of concrete, has an expansion joint every 36 inches, and cost much more to repair. **27**

Letter
B4
cont.

Page 55
Union Point Park
We must not only build these facilities, but we must also maintain them. The park has fallen into terrible condition because of lack of maintenance. We need to plan our parks for maintenance too. **28**

Page 83
Land Use and Transportation Element
Pedestrians and bicycles are not addressed in this section and they should be. Providing access to the waterfront for pedestrians and bicycles is one of the major reasons for Measure DD. **29**

Page 107
Lake Merritt and Lake Merritt Channel [Group I]
Reconfiguration of Snow Park intersection is incomplete.
The section does not mention improved pedestrian or bicycle transportation which are integral to the Measure DD success. Many of the islands need to be removed from the street along with any slip-turns and lakefront park area must be enlarged. Engineering solutions to address motorist negative behavior need to be implemented to make this area more pedestrian/bicycle friendly. Reduce lane width and consider making Lakeside two way. Snow Park Redesign: The design for the street intersection at 20th St./ Harrison St./Snow Park has not been presented to, or approved by the Measure DD Committee. **30**

Page 109
LOS Criteria
Where is the information on how to design quality pedestrian/bicycle infrastructure displayed? I see only vague references to pedestrian/bicycle design, yet it all gets resolved by LOS for motorist. Pedestrians and bicyclist are traffic too and their concerns cannot be an afterthought consideration. **31**

Page 110
slip-turns
Remove all slip-turns from all intersections on this page. Motorist speed is less important than pedestrian or bicyclist safety. If the LOS drops for motorist during peak travel that is unfortunate, but safety for all modes of travel must hold the highest criteria. **32**

Traffic signals for pedestrians and cyclist should have sensors so they will not have to find and push a button to cross a street. A push button can be installed as a backup, but the sensor should be the primary operator. **33**

Safe, high visibility, and convenient pedestrian/cyclist crosswalks must be installed at locations determined by the public. Safety for pedestrians/cyclists are of the highest order.

Page 116
LOS< LOS< LOS
Where is the data for pedestrian travel. There are reams of data on the needs of inanimate motor vehicles, but none for pedestrians/cyclist. **34**

Page 121
Oakland General Plan
There appear to be some general plan elements that would be appropriate for this section. Lets ensure that all the General Plan pedestrian/cyclist issues in the General Plan are included and implemented. **35**

122
Oakland's Standard and Uniformly Applied Conditions [motor vehicle dominant land use]
Much of this and past criteria for transportation is based on the mode shift remaining the same. With the progress being made in Oakland the shift in mode split is already happening. We need to ramp up the installation of pedestrian/cyclist infrastructure to further change the mode split. When that is done many of the reasons for the continuation of motor vehicle dominant land use will decrease and make the statements included in this section erroneous. The date submitted in this section of the Draft EIR are based in the past and do not provide a guide to the future. **36**

Letter
B4
cont.

Page 130
Travel Time in Seconds
Where is similar data for pedestrians or cyclist? When it is not rush our the times are much different. We can allow motorist to slow down a little when their cubic foot consumption of area is to great for the existing roadway. Safety for all. **37**

Page 133
Pedestrian Timing
Glad to see that pedestrians showed up on this page, to bad they are seen as an impediment to motorist travel. **38**

Oak to 9th is part of Measure DD. Whole Foods and Jack London Square are not part of Measure DD. Count the votes and less do a good project for Oakland driven by citizens not developers. **39**

Page 143
Trip generation
The number of trips is determined on the safe methods of arriving and that option for improving non motorized travel have not been fully explored. The project is only planning for more of the same bad motorist city planning we have suffered from for over 50 years. **40**

Page 145
Air Quality
Yes, motorist has many negative effects on our world. This is an opportunity to push for a better tomorrow. Air and light pollution, depletion of finite resources, noise, water pollution, the list goes on and Measure DD continues to embrace it as a necessary. **41**

Page 311
Lake Merritt and Lake Merritt Channel [Group One]

The **Edoff Memorial Bandstand** built in 1918 is misspelled as the Edhoff Band Stand. I would appreciate the correction.

Since you are mentioning the **Edoff Memorial Bandstand** in the Draft EIR, I need to bring to your attention that a new project is under design for the **Edoff Memorial Bandstand** that does not conform to your guidelines as a historic building that you recognize in your document. I support the city negotiating a settlement for the project and making the **Edoff Memorial Bandstand** more accessible, but the city needs to address the needs of all users and respect the design of the historical **Edoff Memorial Bandstand**. Suggest that fixing the lift be negotiated and if that fails revise the proposed ramp solution to be less skateboard and bike friendly, more aesthetic to the original design, and less intrusive on band patrons. This Draft EIR is now required to address the issue of access to the **Edoff Memorial Bandstand** and ensure that the solution conforms to the 1979 guidelines for the building as a historic building. **42**

Sailboat House:
Remove parking from the lake edge. Remove chain link fencing from the boat docks and other areas near the water. **43**

Page -Figure IV.M-3
El Embarcadero Promenade
The picture depicts the promenade between Lakeview Library and shows the pedestrian/bicycle path dead-ending at Grand Avenue with no light or crosswalk. The intersection presently has a crosswalk and is used often. The new plan must conform to the needs of the pedestrians and cyclist that will be the future users of the crossing. Measure DD was passed to improve pedestrian and bicycle travel, not hinder it. **44**

Page -Figure IV.M-4
Boathouse Motorist Parking
This depiction is not as revealing as one from the north side of the building. A perspective from the north would reveal the degradation of the meadow in order to store motor vehicles. **45**

Bicycle parking
No bicycle parking has been determined and it should be. **46**

****

Letter
B4
cont.

There are other comments below that do not have the proper page numbers.
****

Bike Parking:
Locate throughout all the projects and Lake Merritt. Locations to be determined by City of Oakland Bicycle and Pedestrian Advisory Committee-BPAC

Bike lanes.
Establish a bike lane route marked and signed all the way around Lake Merritt in both directions.

Bellevue Avenue redesign:
Install a bike lane on Bellevue. Per the proposal in the DD EIR, the plan is to add parking to Bellevue making it less safe for other users. It is in the park.

46 cont.

Lakeshore:
Bike lanes in each direction and connect to the Lakeshore Shopping District in both directions. Add an advance stop bar for bicycles on Lakeshore Ave. at the intersection of Lakeshore Ave./Lake Park. Decrease the radius of the corner at Lakeshore and MacArthur in front of the Gas Station to slow motorist and improve the pedestrian crossing. Get CalTrans to clean up the area under the freeway.

Pedestrian Crossings
Pedestrian Crossings should be high visibility, include a refuge island, and not require the operation of a push button by the pedestrian to cross the street.

Trees.
Keep non-natives to a minimum.
Keep trees that produce negative allergens to a minimum
Avoid the formal garden approach; Lake Merritt evolved as a natural type of planting.
Choose easily maintained species and planting scheme for the majority of the selections.

47

Sincerely,

Ron Bishop - Architect - AIA
Bishop Architecture
Bicycle Safety Instructor - LCI
[510] 652-4667

LETTER B4
Bishop Architecture
Ron Bishop, Architect, AIA
September 11, 2007

Response B4-1: Notice of the availability of the Measure DD Draft EIR was provided on July 20, 2007 for a 52-day comment period that was to conclude on September 10, 2007. The standard 45-day minimum comment period specified by State law was extended to allow for additional public review opportunities after the Labor Day holiday in early September. In addition, because September 10 was a City of Oakland holiday and City offices were closed, public comments were accepted until September 11, 2007.

The Draft EIR and/or the Notice of Availability were distributed to approximately 60 public agencies, 6 newspaper chains, over 60 neighborhood organizations registered on the City of Oakland's neighborhood association data base, and a host of private individuals who had expressed interest in the Measure DD Implementation Project over its history, and elected officials. Also, in accordance with the City of Oakland Planning Department procedures, copies of the September 5, 2007 Planning Commission Agenda, which listed the Measure DD Public Hearing amongst other scheduled items, were distributed in August to the persons indicated above and to other parties who may not have been associated with Measure DD but who would normally receive the Planning Commission agendas. Additionally, a legal ad that advertised the availability of the Draft EIR and public hearing date was placed in the Oakland Tribune newspaper, and posters publicizing the same information were placed in over 70 locations around Lake Merritt and the Lake Merritt Channel area, the northern and southern areas of the Waterfront Trail, and the East Oakland Sports Complex. The Notice of Availability and Draft EIR were posted on the City of Oakland Planning Department's website at the following location:

www.oaklandnet.com/government/ceda/revised/planningzoning/majorProjectsSection/environmentaldocuments.html

In addition, the Notice of Availability and a link to the Draft EIR were posted on the Office of Public Works' website at the following location:

www.oaklandpw.com/measuredd

Response B4-2: To reduce the number of hard copies of the Draft EIR produced the document was made available in alternative formats. It was posted on the City of Oakland's website and could be provided in an electronic format on compact disc. The Draft EIR was prepared in accordance with Article 9 of the *CEQA Guidelines* and contains all of the necessary information outlined in Sections 15122 through 15132 of those guidelines.

Response B4-3: Section IV.C, Transportation, Circulation and Parking evaluates potential pedestrian and cyclist safety hazards that could result from the proposed project. No hazardous conditions resulting from the proposed project were identified. Visual and acoustical (noise) impacts were evaluated in their respective sections of the Draft EIR. No significant impacts related to the Lakeview Library were identified; therefore no mitigation is required.

Response B4-4: The comment, which suggests a modification to the proposed project, is noted. The proposed modification to the curb width does not identify a new impact or reduce the effect of a significant impact identified in the Draft EIR.

Response B4-5: Agencies were notified of the preparation and availability of the Draft EIR in accordance with Sections 15082, 15085 and 15087 of the *CEQA Guidelines*. The statement concerning the recent repaving of streets does not pertain to the environmental analysis of the Draft EIR.

Response B4-6: Potential project impacts to the Macarthur Boulevard/Lakeshore Avenue intersection were evaluated in Section IV.C, Transportation, Circulation and Parking of the Draft EIR. Impact TRANS-3 identifies an increase of 13.8 seconds during the PM peak hour where the LOS is rated F without the proposed project. Mitigation Measure TRANS-3 recommends several measures that, if implemented, would reduce the vehicle delay by 39.3 seconds during the PM peak hour, causing the intersection to operate at LOS E, improving over existing conditions. Therefore, this impact would be reduced to a less-than-significant impact and the Draft EIR does not identify a significant unavoidable impact for this intersection.

Response B4-7: The Bay Place/Grand Avenue intersection was not evaluated in the Draft EIR. LOS analysis was not performed for this intersection as project traffic would not substantially contribute to an increase in congestion at this intersection. Therefore, no significant impacts were identified at this intersection. The remainder of The comment does not relate to the environmental analysis of the Draft EIR so no further response is provided.

Response B4-8: Proposed improvements to Bellevue Avenue are described on page 47 of the Draft EIR and include sidewalk bulb-outs and narrowing of Bellevue Avenue at its intersection with Grand Avenue. These project elements would improve pedestrian safety conditions by reducing walk time across the intersection, which is identified as a concern in the comment.

Response B4-9: The Draft EIR does not provide detailed analysis of trail paving materials as such analysis would not benefit the evaluation of environmental impacts. The design detail, such as placement of bicycle racks, benches, refuse containers, and restroom and water facilities are not available at this time. Design plans are currently conceptual in nature, and such details will be more closely examined during the design review process.

Response B4-10: It is unclear what the comment means by "C" EIR Scope; there is no reference to a page number and no such heading between pages 25 and 29 of the Draft EIR. On page 25 of the Draft EIR, the Oakland Waterfront Trail and Access Improvements (Group 2) Objectives include improving pedestrian and bicycle circulation.

Response B4-11: The comment, which suggests an alternative method for remediation of site soils, is noted. No significant impacts were identified with regards to site remediation (Section IV.J, Hazards and Hazardous Materials), and thus the proposed alternative method would not affect the analysis or conclusions of the Draft EIR.

Response B4-12: The comment suggests criteria for the design configuration for the Kaiser Convention Center parking area and is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response B4-13: The comment, which also suggests criteria for the design configuration for the Kaiser Convention Center parking area, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response B4-14: Impacts to pedestrian safety throughout the project area are evaluated in Section IV.C, Transportation, Circulation and Parking. Modifications on Oak Street that would calm traffic are described on page 42 of the Draft EIR; Oak Street between 13th and 14th streets would be reduced from four to three lanes. The fourth lane would be converted to a bike lane and the right lane on Oak Street between 12th and 13th streets would be converted to a right-turn only onto 13th Street.

Response B4-15: The comment, which suggests landscaping design and maintenance improvements, is noted. The comment does not pertain to the environmental analysis of the Draft EIR. These suggestions will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B4-16: The comment expresses an opinion on the design of the project and proposes a bicycle connection between the proposed dead-end of Lakeshore Avenue and 12th Street. Bicyclists who wish to connect to 12th Street from the north could do so along 1st Avenue. The suggestion will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B4-17: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response B4-18: The comment, which pertains to the merits of the proposed project, is noted.

Response B4-19: As described in Chapter III, Project Description of the Draft EIR, the proposed project evaluated in the Draft EIR is the implementation of Measure DD-funded activities. The Cleveland Cascade improvement is a component of the implementation plan and is therefore evaluated as part of the proposed project.

Response B4-20: See Response to Comment B4-4.

Response B4-21: The comment, which pertains to the merits of the proposed project, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response B4-22: The comment suggests variations or additions to the proposed project and is noted. The suggestions will be considered by City of Oakland decision-makers during review of the merits of the project..

Response B4-23: The comment, which pertains to the merits of the proposed project, is noted.

Response B4-24: The comment is correct that Measure DD does not explicitly include cessation of bird feed at Lake Merritt. The text of the bond measure does however include water quality improvements, such as wildlife waste clean-up facilities. The text on page 48 of the Draft EIR includes "activities under the Lake Merritt Water Quality Program that *could* [emphasis added] be funded under Measure DD." The City is still studying which, if any, of these might be implemented, but they are included in the project description for completeness. The opinions expressed on this element of the project will be considered by the City of Oakland decision-makers when reviewing the merits of the project.

Response B4-25: Access to park facilities will be reviewed for compliance with the Americans with Disabilities Act (ADA) requirement during the design review process.

Response B4-26: The comment, which expresses an opinion on the merits of the proposed project and does not pertain to the environmental analysis of the Draft EIR, is noted. The suggestion will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B4-27: The comment, which suggests alternative paving materials for the trail and sidewalk elements of the proposed project, is noted. Also see Response to Comment B4-9.

Response B4-28: The comment, which pertains to the maintenance of existing and proposed facilities, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response B4-29: Section IV.B of the Draft EIR (and Appendix D) discusses the project's consistency with the Land Use and Transportation Element of the City's General Plan. Impacts of the project on pedestrians and bicyclists are evaluated in Section IV.C, Transportation, Circulation and Parking. Please see pages 93 and 94 of the Draft EIR, which discuss the City's Bicycle Master Plan and Pedestrian Master Plan.

Response B4-30: The proposed redesign of Snow Park and the Lakeside-Harrison-20th Street intersection are described on page 47 of the Draft EIR (Chapter III, Project Description). The project impacts related to pedestrian and bicycle movements are

evaluated in Section IV.C, Transportation, Circulation and Parking. No significant impacts were identified with regards to pedestrian and bicycle movements, and thus the recommended modifications to the project would not reduce a significant effect or otherwise affect the analysis or conclusions of the Draft EIR. The project, in general, would improve the pedestrian and bicycle environments. While additional improvements may be warranted, the project would not create hazards or exacerbate existing hazards to a level that warrants mitigation. The opinion on this element of the project will be considered by the City of Oakland decision-makers when reviewing the merits of the project.

Response B4-31: Safety improvements for pedestrians and bicyclists are described on page 128 of the Draft EIR. Additional design detail is not necessary to complete the environmental analysis. Specific design details will be considered during the design review process.

Response B4-32: Pages 110-113 of the Draft EIR identify roadway intersections that were analyzed in the transportation analysis of the Draft EIR. The impacts to these intersections by the project are analyzed on pages 122-140. Measures are proposed, as appropriate, to mitigate project-related and cumulative impacts. All feasible mitigation needed to reduce significant impacts to less-than-significant levels has been recommended. The recommendations in the comment would not reduce the effect of a significant impact identified in the Draft EIR.

Response B4-33: The comment does not pertain to the environmental analysis of the Draft EIR.

Response B4-34: Large amounts of data are needed for the motor vehicle analysis. However, it should not be construed that the analysis of the project's impacts to pedestrians and bicyclists was inadequate because it relied on fewer data. "Traffic" hazards, that is hazards to pedestrians and bicyclists that are created by motorized vehicles, are discussed and evaluated on pages 128-129 of the Draft EIR.

Response B4-35: The General Plan policies included in the Draft EIR are intended to be illustrative, not exclusive. To further illustrate applicable policies, page 121 of the Draft EIR is revised to include the following text:

City of Oakland General Plan. The Land Use and Transportation Element (LUTE) of the General Plan has numerous policies related to transportation issues. The primary LUTE policies relevant to transportation, circulation and parking, <u>including those provided in the City's Bicycle Master Plan and Pedestrian Master Plan (which are part of the LUTE),</u> include the following:

Page 122 of the Draft EIR is revised to include the following text:

- <u>Policy D13.2:</u> An adequate quantity of car, bicycle, and truck parking, which has been designed to enhance the pedestrian environment, should be provided to encourage housing development and the economic vitality of commercial, office, entertainment, and mixed use areas.
- <u>BMP Policy 1: Create, enhance and maintain the recommended bikeway network.</u>
- <u>BMP Policy 2: Establish design and maintenance standards for all streets that recognize the needs of bicyclists.</u>

- BMP Policy 4: Include provisions for safe and direct bicycle access to special development areas and key corridors.
- BMP Policy 8: Ensure that the needs of bicyclists are considered in the design of new development and redevelopment projects.
- PMP Policy 2.1: Route Network: Create and maintain a pedestrian route network that provides direct connections between activity centers.

Response B4-36: The comment, which pertains to the significance criteria used in the Draft EIR for the evaluation of project impacts, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so not further response is provided.

Response B4-37: There are no available data for pedestrian or cyclist travel time. The evaluation of impacts using the City's significance criteria would not benefit from this type of information and is not required for the analysis provided in the Draft EIR.

Response B4-38: The comment is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response B4-39: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted so no further response is provided.

Response B4-40: The comment, which pertains to the merits of the proposed project, and not the environmental analysis of the Draft EIR, is noted so no further response is provided.

Response B4-41: The comment, which pertains to the merits of the proposed project, and not the environmental analysis of the Draft EIR, is noted. The topics of air quality, sources of new light and glare, use of resources, noise, and water quality are evaluated in the appropriate sections of the Draft EIR.

Response B4-42: The Edoff Memorial Bandstand is not part of the proposed project, and is therefore not evaluated in the Draft EIR. The fourth paragraph on page 311 of the Draft EIR is revised as follows:

> Adams Park and the Veterans Memorial Building are located at the northwest corner of Lake Merritt at Harrison Street and Grand Avenue and provide space for private events and senior activities. Lakeside Park at Grand Avenue and Bellevue Avenue includes a Lawn Bowling Clubhouse and Greens, non-programmed open space, Children's Fairyland, McElroy Fountain and Specimen Groves, ~~Edhoff Band Stand~~Edoff Memorial Bandstand, a beach, amphitheater, Garden Center, Junior Center of Art & Science, the Sailboat house, the Rotary Nature Center, OPD horse stables, and wildlife areas.

Response B4-43: The comment, which suggests modifications to elements of the proposed project, is noted. As the suggested modifications do not reduce the effect of a significant impact identified in the EIR and the comment does not otherwise pertain to the environmental analysis of the Draft EIR.

Response B4-44: The crosswalk is not visible in the proposed view in Figure IV.M-3 because it will be moved about 80 feet to the north to the reconfigured El Embarcadero intersection where pedestrians can safely cross the street at a traffic signal. The relocation of the crosswalk would not create a significant adverse affect as it relates to the City's criteria of significance. The comment, which pertains to the merits of the proposed project, will be considered by the City of Oakland decision-makers.

Response B4-45: The view depicts one of many changes that would occur around the Boathouse. The analysis in the Draft EIR of the visual effects of the project is consistent with *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential effects of tree removal provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B4-46: The comment suggests a number of design details (e.g., bicycle parking areas, bike lane signage, crosswalk markings) for pedestrian and bicycle elements of the proposed project. Some of the suggested items, such as connections to Lakeshore Avenue are not part of the project; none would affect the analysis or conclusions of the EIR. The comment's suggestions will be considered during the design review process for the project.

Response B4-47: Refer to Response to Comment B4-15.

Letter
B5

MEASURE 'DD' 10:30 PM 9/5/07

- THE DOCUMENT IS NOT GREEN. TO BIG, TO HEAVY, NOT WELL ORGANIZED, CONTAINS INCOMPLETE LETTERS 1
- TREES: KEEP NON-NATIVES TO MINIMUM
  KEEP TREE ALLERGYINS TO MINIMUM.
  RELOCATE TREES, TRIM TREES,
  ONLY REMOVE DANGEROUS TREES. 2
- BIKE PARKING - DISTRIBUTE AROUND LAKE FOR BPAC' 3
- EL EMBARCADERO - MAINTAIN LANES WITHIN (E) CURBS.
  PROVIDE SOUND MITIGATION @ FOR LIBRARY. 4
- BANDSTAND — FIX LIFT 5
- ~~LAKESHORE~~ BIKE LANES BOTH DIRECTION 6
- "C" EIR SCOPE WATERFRONT DOES NOT MENTION BIKE OR PED, 7
- LOS LOS LOS HOW ABOUT PEDS & BIKES 8
- CROSSWALKS MUST BE SAFE 9
- NO FEEDING BIRDS? 10
- BELLEVUE AVE. REDESIGN — NO ~~BIKES~~ MENTIONED 11
- MUCH IS UNREADABLE 12
- MANY "DD" COMMITTEE DID NOT KNOW. 13

I AM TIRED

CIAO,

RON Buckley

LETTER B5
Ron Bishop
September 5, 2007

Response B5-1: Refer to Response to Comment B4-2. The comment does not indicate which letters are incomplete. Scoping comment letters are included in Appendix C and the City believes that all are complete.

Response B5-2: Refer to Response to Comment B4-15.

Response B5-3: Refer to Response to Comment B4-46.

Response B5-4: Refer to Responses to Comments B4-3 and B4-4.

Response B5-5: Refer to Response to Comment B4-42.

Response B5-6: Bike lanes are included in both directions along Lakeshore Avenue under both Variant A and Variant B as described on pages 36 and 41 of the Draft EIR.

Response B5-7: Refer to Response to Comment B4-10.

Response B5-8: Refer to Response to Comment B4-34.

Response B5-9: Improvements that the Measure DD Implementation Project would make to the safety of crosswalks are discussed and evaluated on pages 128-129 of the Draft EIR. The project would not create unsafe pedestrian crosswalks. No further response is necessary.

Response B5-10: Refer to Response to Comment B4-24.

Response B5-11: Refer to Response to Comment B4-46.

Response B5-12: The comment does not specify what in the Draft EIR is unreadable. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response B5-13: The comment does not indicate what information the Measure DD Committee did not know. Refer to Response to Comment B4-1 regarding notification of the availability of the Draft EIR.

Letter
B6

FRIEDERIKE E. DROEGEMUELLER

SEPTEMBER 10, 2007

MS ELOIS THORNTON
Planner IV, CEDA
250 Frank Ogawa Plaza # 3315
OAKLAND CA 94612
eathornton@oaklandnet.com

Via Fax and e-Mail

SUBJECT: Measure DD Environmental Impact Report
Negative Impacts resulting from proposed tree removal at Lake Merritt

Dear: Ms Thornton:

I am forwarding my objections to the City of Oakland's proposed removal of 259 trees from three project areas around Lake Merritt as a part of Measure DD. I have lived in Oakland for almost 30 years and have been walking Lake Merritt during all of those years. I am a voter here, too, and have been for almost 30 years.

I am horrified that city staff feels that removing 259 trees will not adversely impact the Lake. The trees around Lake Merritt—even those the city plans to remove—are an aesthetic & environmental asset to the Lake, especially along bleak Lakeshore Avenue, which (over the years) has become essentially denuded of trees.

Large, mature trees help make Lake Merritt beautiful. Contrary to some city staff perceptions, the trees don't block the lake view, they're part of the view of the lake. Removing 259 trees from Lake Merritt is not a 'temporary' measure—Once these trees are cut down, they'll be gone forever. Worse, many of the trees selected for 'replacement'

- will never reach the stature, grandeur and many don't even have the expected life span of the trees that are going to be removed;
- are not, as city staff have stated, representative of native California species, and may not even be particularly suited to this climate without special care;
- are not of replacement value or size: They are vastly smaller and, more fragile: They don't offer a cool, shady canopy or sturdy trunk you can sit against and read. And they won't, not for another 20 to 30 years, because that's how long it takes a tree to mature.

1

I am deeply angered that the City did not retain Dr Clark's services at the beginning of the project, over two years ago, when his expertise in urban forestry could have been used to integrate Lake Merritt's trees into the Measure DD project,. Sadly, Dr Clark's services have been used to justify removing trees based principally on the reason that the trees will be 'impacted by the project.', or to use the words in his closing paragraph "… (trees) that would be impacted beyond their tolerance…" In other words, it's be more expedient for the City to bulldoze hundreds of trees rather than take a pencil and modify some lines on a piece of paper. The City's timing of Dr Clark's report raises some interesting questions:

- If Dr Clark, as an arborist, have recommended removing 259 trees had not been given the construction plans for the Lake Merritt project as a cast-in-stone done deal?
- Would Dr Clark have found some trees with flaws could be mitigated if 'the plan' weren't so rigid?

2

268 JAYNE AVENUE • OAKLAND • CA 94610
PHONE: 510-834-7598 • FAX: 510-834-7598

Letter
B6
cont.

- What would Dr Clark's recommendations for design, selection, pruning, siting and maintenance have been, had he been called in as an arborist during the planning and design phases
- Why didn't the City call in Dr Clark, or another consulting arborist, at the start of these projects, rather than wait for almost two years after the public outcry against the wholesale removal of trees in a city park?

2 cont.

Dr Clark reports differ from city staff declarations: He found few trees were diseased or insect infested. In fact, Dr Clark points out that a number of the trees are suffering from diseases of abiotic origin, such as inappropriate watering or injury. Most of all, Dr Clark's analysis shows that over 80% of the 259 trees are in fair or better condition, and the reason given for removing them is that they will be 'impacted by the project'— or put a little less delicately, the city thinks that the trees are in the way.

3

While Dr Clark valued the trees being removed at @$372K, the city did not provide data indicating the replacement cost of these trees, which is not just the value of the tree, but the cost of its removal and transplantation of an equivalent specimen (or where an equivalent sized tree cannot be transplanted, an equivalent specimen of smaller size is planted and the difference in value is made up in cash). The data in the report cannot be used to determine whether removing Lake Merritt's 259 trees of average 19" diameter [total diameter = 4921"] and replacing them with 521 saplings of average 1" diameter [total diameter = 521] is a break even equivalent, or if it's a net loss, as a simple numeric comparison of the total trunk diameters indicates.

4

Regrettable, too, are the absence of multiple data points which could afford better projections as to when the 'replacement trees' will achieve a 'break even point' with the negative impacts of removing Lake Merritt's 259 trees. Based on Dr Clark's three data points for the following criteria, the estimated the time it will take the 521 saplings to provide the same positive effects that Lake Merritt's 259 doomed trees currently provide is as follows:

Environmental Impact	Equivalence to 2007 effects will occur in	Number of years to reach equivalence
Energy Savings	@ 2020	13 Years
CO2 Savings	@ 2024	17 Years
Storm Water Runoff Reduction	@2030	23 Years

5

There were no figures given that can be used to estimate how long it will take for 1" saplings to reach an equivalent to the 19" average trunk diameter (or canopy size) of the 259 Lake Merritt trees, however it is reasonable to say it will take most 'nursery' trees between 15 to 35 years to reach maturity.

6

Dr Clark's report brushes on 'aesthetics' of the 259 Lake Merritt trees, and asserts that the old, mature trees have an almost equivalent aesthetic value as the saplings. I disagree. It will be years, if not generations, until any sapling possesses the strength, grace, and size or the existing, mature trees.

7

I urge the City of Oakland to redraw its Measure DD plans and allow the Lake Merritt's healthy, mature trees to survive and let those established trees be the foundation plantings that will help nurture the hundreds of new trees that our park needs to keep Lake Merritt clean, beautiful and healthy.

8

Yours truly,

Friederike E. Droegemueller

LETTER B6
Friederike Droegemueller
September 10, 2007

Response B6-1: The comment regarding a number of opinions and objections to the removal of trees around Lake Merritt is noted. The aesthetic and environmental (biological) impacts associated with the tree removal are discussed on pages 218-219 in Section IV.F, Biological Resources, and pages 336, 341-343 in Section IV.M, Aesthetics, wherein it is concluded that the impact is less than significant for the reasons provided therein. *CEQA Guidelines* Section 15151 states: "Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure." This Response to Comments Document discusses points of disagreement with the analysis in the Draft EIR (including the analysis of impacts to aesthetic and biological resources) and provides additional information to support the conclusions in the Draft EIR. Refer also to Master Response M-1 and Responses to Comments B3-3 to B3-16 and B3-25 to B3-27.

Response B6-2: The comment asks how the arborist's conclusions might have differed if he had been asked to evaluate the trees earlier in the design process or under a different set of circumstances. It would be speculative (even for Dr. Clark, the certified arborist who evaluated the tree removals) to suggest what conclusions might have been drawn earlier or under different circumstances. Dr. Clark was asked to evaluate the health and structural conditions of the trees, the potential to relocate trees, the risk of tree failure, tree values, the economic and environmental benefits of the trees, and the impacts of the project to the trees. Dr. Clark's report is provided in Appendix I and was considered in the impact evaluation for the project, as indicated on pages 218-219 of the Draft EIR. Dr. Clark's recommendations were also considered during the design of the project. He recommended four trees for preservation and these recommendations are included as part of the project as noted on page 30 of the Draft EIR. Refer also to Master Response M-1 and Responses to Comments B3-3 to B3-16 and B3-25 to B3-27.

Response B6-3: Refer to Master Response M-1 and Responses to Comments B3-6 and B3-7, which address comments on the health status of trees to be removed as part of the project.

Response B6-4: Replacement costs for the trees to be removed as part of the project do not fall under the definition of environmental impacts in CEQA and therefore are not discussed in detail in the Draft EIR. The Draft EIR correctly focuses on the physical effects of the project, which include impacts to biological and aesthetic resources associated with the removal of trees. These affects were found to be less than significant as described in Section IV.F, Biological Resources and Section IV.M, Aesthetics.

Response B6-5: The comment expresses regret that additional data points are not provided to identify when the "break even point" would be achieved for the various costs/benefits of tree removal or replacement that are assigned monetary values by HortScience in Appendix I. The additional data are not required to evaluate the impacts of the tree removal for purposes of CEQA. The bases for determining significance are the significance criteria presented in the Draft EIR. Applicable criteria for tree removal are presented in Section IV.F, Biological Resources and IV.M, Aesthetics. The information in Appendix I informs the evaluation of compliance with the City's Tree Preservation and Removal Ordinance, one of the criteria for determining the significance of impacts to biological resources, by assigning monetary values to resource benefits like energy conservation, sequestration of carbon dioxide, aesthetics and other factors as explained on pages 218-219 of the Draft EIR. Although there are limitations with assigning monetary values to resources like trees (i.e., resource valuation generally lacks a reliable way to estimate the value of ecological damage), the data produced by HortScience suggest that the costs of tree removal do not outweigh the benefits of tree replacement.

The analysis in the Draft EIR of the effects of tree removal/replacement is consistent with *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential effects of tree removal provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B6-6: Estimates of the amount of time required for a 1-inch diameter sapling to reach 19 inches in diameter are not provided because this information is not needed for the environmental analysis. The factors used in the determination of significance are provided in Section IV.F, Biological Resource and Section IV.M, Aesthetics, with supporting documentation provided in Appendix I. The analysis in the Draft EIR of the effects of tree removal/replacement is consistent with *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential effects of tree removal provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B6-7: Refer to Response to Comment B6-1.

Response B6-8: The comment urges the City to withdraw its Measure DD plans. The opinions expressed in the comment will be considered by the City of Oakland decision-makers during review of the merits of the project.

Letter
B7

From: machenry@netzero.net
Sent: Tuesday, September 11, 2007 3:53 PM
To: Thornton, Elois
Subject: Please consider these coments for the DD EIR Sept, 11 2007. It is rush ed and incomplete but this is the best I can currently do. ps why isnt it oaklandnet.gov?

Hi All,

Reminder:

Today Tuesday 9/11/07 is the final day to submit comments for the Bond measure DD Environmental Impact Report (EIR). One large item is the removal of over 250 mature trees planted around lake Merritt and the lake Merritt Estuary over the last hundred years.. Yes Lake Merritt is an estuary, where streams meet the sea. Lake Merritt would flood where it not for the floodgates. Oaksterdam is literally at sea level especially during flood conditions and would flood where it not for the floodgates. Is Lake Merritt the eldest officially designated wildlife sanctuary in the U.S..; located in the middle of of one of Americas largest port cities? Yes, since 1870. **1**

Though DD was passed in November of 2002 the EIR was not started until January of 2007 due to community concern of the lack of not having done an EIR. Six of the trees are actually dead, a few are sick.. This unique Urban forest has not been nurtured or maintained since the early nineteen eighties. The exception is the City sponsored Lake Merritt Institutes efforts to improve the water quality over the last ~ ten years, though this has not included the trees. A few trees are eucalyptus and montery pines, some consider these species weeds. This still leaves over 200 Elder healthy trees which are now considered a "construction conflict" and a hinderence to the "view corridor" for all the new 20 to 60 story buildings slated to go up on this toxic, muck filled tidal estuary which the trees are helping to heal.. Meanwhile other neglected areas of Oakland are still not made available for people housing.. **2**

The Bond Measure DD implementation does not follow the Lake Merritt Park Master Plan published by the City of Oakland in July 2002, especially in regards to the trees. All of the development projects where not spelled out in DD. Another issue with bonds is there is nothing to specify that the money actually gets spent on what the bond measure references. **3**

We are actually loosing park land including Oak to ninth and the parking lot for the new boathouse restaurant. We almost lost the neglected Oakland school property, of over 6 acres, that borders the lake Merritt channel to other development. Curiously, due to negligence, part of the lake Merritt channel/estuary has reverted back to wilderness. **4**

Letter
B7
cont.

One idea was to clearcut the DD wildlife sanctuary project areas. Now it is only clearcut/2, or one half of the trees in the project areas. If this can happen to this wildlife sanctuary, what about the others?

4 cont.

Contact information is:

Elois (think super person, like Lois lane) A. Thornton, Planner 4, City of Oakland , Community and Economic Development Agency, planning Division, 250 Frank H. Ogawa plaza, Suite 3315, Oakland , CA 94612; telephone 510 238 6284; E- Mail eathornton@oaklandnet.com .

" We have so little to do and so much time to do it in" - Willey Wonka.

"The Earth can no longer be healed on a physical Level. Only a spiritual healing can change the course of the probable futures of mankind".

- Tom Brown, Jr., from the quest

Peace,

John

Oakland Ca in the year of our lord 2007, Sept 11.

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http://3rdpartyoffers.netzero.net/TGL2211/fc/Ioyw6ijmL63wghR9MSwvrLttatMqnOqfTir9tC6r1o0Xru4xKPabl7/

LETTER B7
John MacHenry
September 11, 2007

Response B7-1: The comment expresses concern over the removal of trees from the project area and also notes that the Lake Merritt area is protected from flooding by the existing floodgates. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided. Refer also to Responses to Comments A2-2 and A2-3 for more information with regard to operation of the existing floodgates.

Response B7-2: The text on page 23 of the Draft EIR provides background on the environmental review process that has occurred since passage of Measure DD. The text on page 24 of the Draft EIR describes the current need for completion of a more comprehensive environmental analysis due to the availability of more defined project components. The comment also notes a lack of maintenance of existing trees and vegetation. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response B7-3: The comment, which notes that Measure DD Implementation Project does not follow the Lake Merritt Park Master Plan, is noted.

Response B7-4: The Oak to 9th Project is not part of the proposed project evaluated in the Draft EIR. The Oak to 9th Project is subject to separate environmental review. As noted on page 42 of the Draft EIR, existing parking facilities at the Boathouse are proposed to be relocated and consolidated into a 28-space parking lot in the existing lawn area north of the Boathouse. No net loss of parking would result from renovations at the Boathouse. The remainder of the paragraph contains statements that do not pertain to the environmental analysis of the Draft EIR.

Letter
B8

From: Joe Matera [materare@yahoo.com]
Sent: Tuesday, September 11, 2007 4:50 PM
To: Thornton, Elois
Cc: gofindnancy@yahoo.com; RBishop747@aol.com; jim@virtualperfection.com; pdow@mindspring.com; anne.symanovich@wellsfargo.com; dgill8848@yahoo.com; gpieretti@sbcglobal.net; yishanchen@yahoo.com
Subject: Comments on Draft EIR for Measure DD: Save the Boathouse Meadow, Stop the Grand Staircase

I am a member of the Save Our Meadow citizen group that attempted to save the existing meadow at 17th Street and Lakeside Drive in Lake Merritt Park. With the help of several landscape architects, our group created a plan (Option 2 - see attached) for the Lakeside Drive/ Boathouse part of the Prop. DD project that saved more than twice as much meadow space as the plan (Option 1) that the city eventually adopted (see attached drawings). The city council chose Option 1 because our plan (Option 2) was rejected by the restauranteur the city council wanted as the future tenant in the Boathouse.

I'm hoping that the new Planning Commission and City Council will reconsider and choose the Option 2 plan that the Save Our Meadow group developed to save this rare and important downtown park space. Please note also that both Option 1 and Option 2 provide about the same number of parking spaces for whatever use is evenually made of the Boathouse space, but Option 1 permanently eliminates the meadow and turns it into a narrow strip which can no longer reasonably be called a "meadow". Also, the city's own Bicycle and Pedestrian Advisory Committee overwhelmingly favored Option 2 (by a vote of 7 for Option 2, 0 for Option 1). Option 2, with a much simpler and straighter orientation and fewer places where pedestrians or cyclists cross over driveways, is clearly safer for pedestrians and bicyclists. **1**

I have other drawings that I can send showing ways that Option 2 can be reworked in ways that preserve the meadow space while adding more parking (if this is necessary) and/or moving the garbage area for the Boathouse. **2**

The values we thought we were voting for when we approved Prop. DD - preserving, enhancing, and enlarging park space in Lake Merritt Park - should be favored over the desires of a proposed commercial tenant in the Boathouse space. Option 1 contradicts these values; Option 2 supports them. **3**

In addition, on the plans for the Boathouse area please note the **4**

Letter
B8
cont.

"Grand Staircase" which extends from the Boathouse to Lakeside Drive. This is not an existing feature and the construction of this staircase will eliminate another large expanse of open green space, replacing it with a paved staircase. This staircase is not handicapped accessible, and was also not included in the original plan for the boathouse area that was presented by the city before the vote on Prop. DD. This destruction of park space, inserted after the Prop. DD vote, serves no useful purpose and should not be allowed under the terms of Prop. DD, which again was supposed to preserve, enhance and enlarge park space.

4 cont.

As I look out at this moment at Lake Merritt Park as it stretches from 12th Street to 17th Street along Lakeside Drive, I see a superb uninterrupted green open meadow. Please do not allow this beautiful expanse to be broken up and paved over by an unnecessary parking lot and "Grand Staircase", in direct contradiction to what we voters thought were the goals and intentions of Prop. DD. Choose "Option 2" (attached) and eliminate the "Grand Staircase".

5

Joe Matera
Acting President, Essex Homeowners Association (1 Lakeside Dr.)

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Letter
B8
Attach

LETTER B8
Joe Matera
Acting President, Essex Homeowners Association
September 11, 2007

Response B8-1: The comment's preference for a variant (Option 2) of the Municipal Boathouse Improvements project element over the variant (Option 1) analyzed in the Draft EIR is noted. During project development Option 2 was considered along with other designs, which included Option 1 and a third option that proposed a larger parking lot and a smaller meadow. The design analyzed in the Draft EIR relocates existing parking facilities provided at the Municipal Boathouse site and creates a meadow of intermediate size compared to the other options. As shown on Figure III-8 in the Project Description, as compared to the drawing provided in the comment for Option 2, the proposed project decreases the massing of parked cars along Lakeside Drive, accommodates approximately 15 additional vehicles, and provides a landscaped buffer between the parking lot and Lakeside Drive.

No significant impacts were identified for the Municipal Boathouse improvements, including safety impacts to pedestrians or bicyclists, which the comment identifies as a concern. Thus, the Option 2 variant would not reduce significant impacts identified in the Draft EIR. The proposed project adds a bike lane along Lakeside Drive and creates bulb-outs and shortened crossing distances of Lakeside Drive, which would improve pedestrian and bicyclist safety. The entry and exit of the parking lot would be properly controlled and would not create an unsafe design hazard. The suggestions made in the comment will be considered by City of Oakland decision-makers during review of the merits of the project.

Response B8-2: The comment offers revised drawings of Option 2 for the City's consideration. The comment does not address the environmental analysis of the Draft EIR so no further response is provided.

Response B8-3: The comment, which pertains to the merits of the project, is noted.

Response B8-4: The comment incorrectly states that provision of a staircase at the entrance to the Boathouse would destroy park space. The area would remain park land, albeit hardscape rather than landscaping. The plans described in the text and shown on Figure III-8 and III-9 accurately depict the proposed project that was evaluated in the environmental analysis. Access (handicapped accessibility) to park facilities will be reviewed for compliance with the requirements of the Americans with Disabilities Act (ADA) during the design review process.

Response B8-5: The comment pertains to the merits of the project and asks that the City not construct the parking lot north of the Boathouse.

Letter
B9

From: David Gill [dgill8848@yahoo.com]
Sent: Tuesday, September 11, 2007 4:54 PM
To: Thornton, Elois
Subject: Fw: Comments on Draft EIR for Measure DD: Save the Boathouse Meadow, Stop the Grand Staircase
Corrected address.

----- Forwarded Message ----
From: David Gill <dgill8848@yahoo.com>
To: Joe Matera <materare@yahoo.com>; ealthornton@oaklandnet.com
Cc: gofindnancy@yahoo.com; RBishop747@aol.com; jim@virtualperfection.com; pdow@mindspring.com; anne.symanovich@wellsfargo.com; gpieretti@sbcglobal.net; yishanchen@yahoo.com; Sylvia Rampi <srampi2@earthlink.net>; Phyllis Harris <phyllispbh@sbcglobal.net>
Sent: Tuesday, September 11, 2007 3:49:58 PM
Subject: Re: Comments on Draft EIR for Measure DD: Save the Boathouse Meadow, Stop the Grand Staircase

Thank you, Joe. More and more it becomes clear that this the selected option is a terrible use of Measure DD funds and absolutely NOT what the voters intended when they voted for the measure. It's not too late to bring a proper perspective to this portion of the lake project as work has begun on only one aspect, the boathouse, and it's obvious that completion is a long, long way off. **1**

Sincerely,

David Gill
Past President, Lakeside Regency Plaza Homeowners Association

1555 Lakeside Drive, #182
Oakland, CA 94612
510-452-8848 phone // 484-932-6254 eFax // 510-388-8848 cell
Map: http://maps.yahoo.com/beta/#maxp=search&q1=1555+Lakeside+Drive+Oakland%2C+CA+94612-4535

----- Original Message ----
From: Joe Matera <materare@yahoo.com>
To: ealthornton@oaklandnet.com
Cc: gofindnancy@yahoo.com; RBishop747@aol.com; jim@virtualperfection.com; pdow@mindspring.com; anne.symanovich@wellsfargo.com; dgill8848@yahoo.com; gpieretti@sbcglobal.net; yishanchen@yahoo.com
Sent: Tuesday, September 11, 2007 3:39:11 PM
Subject: Comments on Draft EIR for Measure DD: Save the Boathouse Meadow, Stop the Grand Staircase **2**

Letter
B9
cont.

I am a member of the Save Our Meadow citizen group that attempted to save the existing meadow at 17th Street and Lakeside Drive in Lake Merritt Park. With the help of several landscape architects, our group created a plan (Option 2 - see attached) for the Lakeside Drive/Boathouse part of the Prop. DD project that saved more than twice as much meadow space as the plan (Option 1) that the city eventually adopted (see attached drawings). The city council chose Option 1 because our plan (Option 2) was rejected by the restauranteur the city council wanted as the future tenant in the Boathouse.

I'm hoping that the new Planning Commission and City Council will reconsider and choose the Option 2 plan that the Save Our Meadow group developed to save this rare and important downtown park space. Please note also that both Option 1 and Option 2 provide about the same number of parking spaces for whatever use is evenually made of the Boathouse space, but Option 1 permanently eliminates the meadow and turns it into a narrow strip which can no longer reasonably be called a "meadow". Also, the city's own Bicycle and Pedestrian Advisory Committee overwhelmingly favored Option 2 (by a vote of 7 for Option 2, 0 for Option 1). Option 2, with a much simpler and straighter orientation and fewer places where pedestrians or cyclists cross over driveways, is clearly safer for pedestrians and bicyclists.

2 cont.

I have other drawings that I can send showing ways that Option 2 can be reworked in ways that preserve the meadow space while adding more parking (if this is necessary) and/or moving the garbage area for the Boathouse.

The values we thought we were voting for when we approved Prop. DD - preserving, enhancing, and enlarging park space in Lake Merritt Park - should be favored over the desires of a proposed commercial tenant in the Boathouse space. Option 1 contradicts these values; Option 2 supports them.

In addition, on the plans for the Boathouse area please note the "Grand Staircase" which extends from the Boathouse to Lakeside Drive. This is not an existing feature and the construction of

Letter ***B9*** *cont.*

this staircase will eliminate another large expanse of open green space, replacing it with a paved staircase. This staircase is not handicapped accessible, and was also not included in the original plan for the boathouse area that was presented by the city before the vote on Prop. DD. This destruction of park space, inserted after the Prop. DD vote, serves no useful purpose and should not be allowed under the terms of Prop. DD, which again was supposed to preserve, enhance and enlarge park space.

As I look out at this moment at Lake Merritt Park as it stretches from 12th Street to 17th Street along Lakeside Drive, I see a superb uninterrupted green open meadow. Please do not allow this beautiful expanse to be broken up and paved over by an unnecessary parking lot and "Grand Staircase", in direct contradiction to what we voters thought were the goals and intentions of Prop. DD. Choose "Option 2" (attached) and eliminate the "Grand Staircase".

2 cont.

Joe Matera
Acting President, Essex Homeowners Association (1 Lakeside Dr.)

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LETTER B9
David Gill
Past President, Lakeside Regency Plaza Homeowners Association
September 11, 2007

Response B9-1: The comment, which pertains to the merits of the proposed project, is noted.

Response B9-2: This portion of the comment letter contains the text of Joe Matera's comment letter (letter B8) to the City. Refer to Responses to Comments B8-1 to B8-5.

Letter
B10

Thornton, Elois

From: darlinemix@sbcglobal.net
Sent: Wednesday, September 05, 2007 12:29 PM
To: Thornton, Elois
Cc: gofindnancy@yahoo.com; johninoakland@netzero.net
Subject: Measure DD Draft EIR File No. ER06-0017

Ms Thornton

This email and comments are for the "record" and it is requested that it be presented at the public hearing of Sept. 5, 2007, regarding Measure DD Draft EIR, item 4 of the agenda. **1**

1) Considering the size and subject depth of the DEIR the typical 2 or 3 minutes the commission allows speakers to give oral testimony is sorely inadequate. The CEQA laws require public participation, which is a vital part of the democratic process. Drastically limiting speaker time defeats that purpose and violates the law and its intent. A public hearing cannot be construed as having taken place unless an adequate and reasonable amount of time is allocated for testimony and public comment. It is hereby requested that a reasonable amount of time be allowed and that we be provided advanced notice of your determination regarding this matter. **2**

2) The reproduction of materials submitted by interested parties and other agencies, etc., as part of the "scoping" process under CEQA, (Appendix C) is of extremely poor quality. The letters were reduced to a size practically unreadable while the photos are indecipherable with unreadable captions. Additionally, the letters and photos are presented in a hodgepodge, mismatched fashion making it difficult to determine which photos relate to which letters.

CEQA and the public process clearly provides for written comments and accompanying documents. The reproduction of these items in an unreadable form (especially photos) in this public document, (Draft EIR), can only be construed as a blatant violation of the statutes. **3**

It is a despicable tactic to undermine and discredit contrary opinions and comments by reproducing them in a grossly substandard form. Any and all material submitted as part of this public process deserves no less, than to be reproduced in a form, print size, and clarity equal to the document itself, likewise, the photos deserve the same treatment as the photos and illustrations of the DEIR. In this present day of electronics and reproduction techniques there can be absolutely no excuse for the shabby treatment given the submitted material.

By this letter it is hereby requested that an addendum to this DEIR be published and provided for Appendix C in a format (readable) as required by law and that the public comment time be necessarily extended to accommodate same. **4**

David E. Mix

9/5/2007

LETTER B10
David E. Mix
September 5, 2007

Response B10-1: The introductory statement to the comment, which requests that the letter be presented at the public hearing meeting on September 5, 2007, is noted. Elois Thornton, City Planner, acknowledged receipt of the letter during the public hearing. Refer to Responses to Comments B10-2 to B10-4.

Response B10-2: The comment, which pertains to the amount of speaker time available at the public hearing, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response B10-3: Full size copies of the original public comment letters that were received during the EIR scoping period have been and are available for review at: City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612.

Response B10-4: The comment, which requests an addendum to the Draft EIR to provide full sized public scoping comment letters as part of Appendix C, is noted. Also see Response to Comment B10-3.

Letter
B11

September 13, 2007

City of Oakland
CEDA
Elois Thornton

Re: DD DEIR

Elois:

Not knowing what kind of reproduction quality the fax transmitted, enclosed is a clean copy of my comments as forwarded to you earlier along with a couple of photos (a picture is worth a thousand words) and elevations. All from the documents I mentioned in my comment letter and City files except as noted.

Thanks again,

David E. Mix

Letter
B11
cont.

September 11, 2007

Ms. Elois Thornton, Planner IV
Community and Economic Development Agency
250 Frank Ogawa Plaza, Suite 3315
Oakland, C A 94612

Re: City of Oakland Measure DD Implementation Project
Environmental Impact Report - Public Review Draft, (DEIR)

Dear Ms Thornton:

Please consider the following comments regarding the above captioned matter.

The DEIR is sorely inadequate. It fails to identify many Environmental Impacts or adverse effects the project will have on the environment and where it does identify an impact it is arbitrarily treated as "less than significant" or claimed to be mediated by an insufficient or inadequate solution.

The Environmental evaluations made by LSA are, in most part, based on inferior and inaccurate reports produced through incomplete and shoddy investigations resulting in misleading and totally false conclusions.

In other areas the detrimental impacts produced by the project are merely ignored or arbitrarily and capriciously rated as *less than significant.*

There are nine primary subjects of vital concern but, by no means are my comments to be considered limited to those particular subjects and my contention that the DEIR is inadequate and fails to identify significant environmental impacts, necessarily covers any and all of the Measure DD projects.

1

LAKE MERRITT AREA - CHANNEL AREA - EMBARCADERO

1) Hydrology of the Lake and the Channel

2) Flooding of Lake Merritt area, Channel area and Embarcadero area (Oak to Ninth, etc.)

3) Contaminated soils, channel area, and elswhere.

4) Traffic congestion and subsequent pollution.

5) Unnecessary removal of trees, lake area, channel area and especially the Auditorium parking lot, but certainly not limited thereto.

Letter
B11
cont.

6) Public safety - Multi-use paths - elimination of traffic "pork chops", endangering pedestrians and bicyclist.

7) Engineered degradation of open space parkland (Boathouse/Restaurant parking lot).

8) Depriving the public access to public spaces (Boathouse/Restaurant).

9) Elimination of public restrooms in vital and needed locations.

1 cont.

LAKE MERRITT

Lake Merritt has been a subject of controversy for more than a hundred and fifty years. When Doctor Samuel Merritt, then Mayor of Oakland, damed San Antonio Slough (said to be with a lot of his own money) in 1869 to form a lake he was a large property owner of parcels on the North side. It was rumored to be more of real estate speculation in creating lake front property (and to eliminate the smelly slough) rather than for a civic purpose.

2

In 1870 when the Governor signed the bill creating Lake Merritt as the first wildlife refuge and waterfowl sanctuary in North America, the real intent may have been to protect human life from hunters who often used the area for hunting, not to mention the noise impact of gun fire on potential property sales.

JUNK SCIENCE

The tidal flows of Lake Merritt and its varied elevations are controlled by gravitational forces and the flood gates and pumps at the 7th street crossing, owned and operated by the County of Alameda, (Flood Control and Water Conservation District).

In June 2002 URS published a Feasibility Study and Greenbelt Plan, for the Lake Merritt Channel (commissioned by the Port of Oakland). The study covered four alternatives in modifying the channel and removal or relocation of utilities within the channel to improve water flow and tidal flushing action. In June 2004 URS prepared an addendum to their 2002 Greenbelt study.

3

The 2002 Greenbelt plan in its hydraulic analysis references HEC-RAS River Analysis System software, Version 3.0.1 (March 2001) a one-dimensional hydrodynamic model developed by the U.S. Army Corps of Engineers. Material produced later by PWA (Phillip Williams and Associates) in several reports references a MIKE 11 model and as modified by PWA.

There is no clarification in any of the reports indicating

Letter
B11
cont.

what MIKE 11 is and there is no indication in the URS 2002 report referencing a MIKE 11 model. This of course begs the questions. What is it? Who created it? And, precisely what information was used in its creation - How can we check the results if the whole thing is treated like a secret. In other words, show us the numbers.

3 cont.

Understanding that a tidal flow model must consider all restrictions in the channel including culverts and pipes, etc. and foremost, the County Flood Control Station, the exact dimensions of those openings is of vital importance.

Additionally, the exact elevation of the devise is critical to a projected flow. Unless the devise remains completely submerged at all times, including median low low tides, the full geometric dimension is not utilized.

The PWA Report of October 04 (and others) shows the flow area in square feet of the various culverts and channel restrictions. The culverts at 12th and 10th streest are shown at 260 sq. ft. However, the dimensions are, 8, 6x6 cells. 6x6=36 times 8=288, and not 260. The Flood Gates at 7th street are shown at a dimension of 12x17 for the box culverts which equals 204 times (2) culverts for a total of 408 and not 554 at listed in the PWA report.

4

More critical to the flow however, as noted above, is the elevation of the culverts, As an extreme example, if the elevation of a given culvert were completely above the given flow line (elevation) the flow would be negligible or nonexistent. Likewise, if the culvert were located at an elevation midway of the flow line then only half of the culvert's sq. ft. area would be utilized.

Additionally, the Oakland Inner Harbor has an average tidal range of 6.38 feet, while the Lake has a tidal range of about two feet. In either area, Inner Harbor or the Lake, the elevation of a culvert is critical to the flow. If a culvert's top is at the high tide elevation then the dimensional water flow through the culvert will gradually decrease as the water level drops. As is the case at the Lake opening to the channel, the Lake tidal range is no more that two feet, as the water drops, the flow decreases from the maximum of two feet to zero.

At the pump station, the elevation of the bottom of the culverts is -8.27 ft. (NAVD88) while the rock and dirt guard is at -0.93, and the top of the BART Tunnel is at -0.30. Although the total height of the culvert is 17 ft. the high tide line is at approx. 5.4 (at that location) which leaves only 13.3 feet of the culvert height being utilized. This calculates to 320 sq. ft. (13.3x12=160 times two) of water flow and not 554 sq. ft. as shown by PWA.

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cont.

As the water drops to the low tide line of 3.4 feet, only 11.7 of the culvert height is utilized, which results in only 140.4 sq.ft. of water flow (times two, equals 280.8 - less than the 288 sq. ft.at 12th and 10th streets). That flow however, is negatively impacted by the depth of these culverts which lie 7.4 feet below the elevation of the EBMUD 84" sewer interceptor (El. -0.87') at the mouth of the channel at the Embarcadero Bridge, just below the 54" EBMUD sewer line and the 24' high pressure gas line and where it extends five feet above the channel bottom, acts as a weir restricting flows and at very low tides creates an actual waterfall, clearly visible from the Embarcadero Bridge.

Subsequently, the area between the EBMUD 84" interceptor (El -0.87) and the lowest point of the flood control box culverts (El -8.27) act as a huge channel invert and either restrict flows or are not negligible in making flow calculations. In other words, once the water level drops to the height of the 84" sewer interceptor (-0.87 feet) the lower portion of the 7th street flood gate box culverts (7.4 feet) is then below the flow line and becomes ststic. At that point the active geometric dimensions of the flood culverts would be zero. As the water rises it would increase from zero to the high tide level at that location of approximately 6.45 feet, producing just under 100 sq. ft. of active geometric flow area, times two culverts, equals less than 200 sq. ft. Please note however, the various tide levels (High and low) at particular locations along the channel are the results of "Hydraulic Modeling" and not actual field measurements, subsequently, they are highly suspect There is nothing provided in the various engineering reports indicating how these issues are treated.

4 cont.

Understanding that the EBMUD 84" interceptor pipe at the mouth of the channel is the greatest impediment to channel flows, it is bewildering why it hasn't been addressed in this project. Additionally. the BART Tunnel which lies a mere -0.30 in depth just above the 7th street Flood Gates, also has not been addressed. The depth at the lake opening could be increased (dredged) from its present 1.58 feet to match BART's depth at 0.30 and the channel widened to 100 feet and open bridges erected at 12th and 10th streets but it still will not make an appreciable difference in tidal flushing action where the average depth of the lake is approximately -3½ feet, more than three feet lower than the BART Tunnel.

5

FLOODING

At the other end of the spectrum is flooding. The URS Report clearly points out that "extreme tides" are not necessarily that extreme. The higher high elevation for the model used reaches approximately 8.0 feet while the lower low elevation is approximately -0.7 feet. (Note!, all elevations are North American Vertical Datum of 1988, (NAVD88)). From tidal data records from

6

Letter
B11
cont.

January 1996 through May 2002, a higher high tide elevation of 8.0 feet has been reached 17 times.

Under the URS scenario (2002) of alternative No. 3, where both 12th and 10th streets are open with an arch bridge, the 84" sewer interceptor is removed, the channel is widened at the mouth with a new Embarcadero Brideg and the 7th street flood control struc-ture is relocated to the Lake, flooding becomes very likely under existing conditions. Lake tidal elevations would range from a low of 3.6 feet to a high of 6.9 feet and with a tidal range of 3.3 Feet.

6 cont.

Durin existing conditions potential flooding may occurat the Municipal Boathouse main deck and storage room, the Sailboat House and Boat Rental Office, the lower and upper ends of Lakeshore Avenue and the intersection at the veterans memorial Building, Grand and Harrison. And an extreme tidal cycle could push the range to as high as 5.3 and most certainly cause sig-nificant flooding in the above areas and far beyond.

It is quite simple, the County flood control station at the 7th street crossing was built in 1968, following the devastating flood of October 13, 1662. It was engineered and designed to protect against adverse weather and alleviate the potential for catastrophic flooding through a sophisticated arrangement of diesel pumps and automatic flood gates.

7

According to Alameda County documents (Brown and Caldwell, Consulting Engineers) 1966 Flood Control Facilities Study, the pump station may also be used for flushing operations. It is estimated that an average of about 15 pump-hours is used for each lake flushing operation and about 150 pump-hours per year is needed for flushing.

According to the County, starting with a lake water surface elevation of 5.2 (NAVD) (original 2.5 SLD29) feet it is possible to withdraw and back-fill 2.0 feet of water (320 acre-feet) within 12 hours elapsed time. Flushing volume can be increased by extending the time allowed for the flushing operation. Also, the volume of degraded water removed from Lake Merritt can be increased by raising the lake level prior to flushing. For example, operation of the pumps in the backfilling mode for about 2½ hours prior to flushing would raise the lake one foot. In the following 12 hours the lake could then be lowered three feet (480 acre-feet) and raised two feet to restore it to the normal operating level. (see Coiunty Report, page 35)

8

In other words, the County is capable of establishing the Lake at any level, at any time, or on any giving day the City may desire, Or, to completely and totally flush the lake, every day, once a week, once a month, or as seldom or as often as the City may desire. The contention that the pumps only operate 1% of the time is, if at all true, by the City's choice.

Letter
B11
cont.

None of the above potential flooding issues or preventive measures are addressed in the DEIR - it is totally lacking. 9

CONTAMINATED SOILS

The DEIR readly admits that it doesn't address possible contaminated soils, especially in the channel area. The investigation falls far short in that there has been no soil samples taken regarding fill or a review of past activities at the various locations which may have contaminated the soil. As known to many Oaklanders the site was the Exposition Building and Oakland's race Way Dirt Track for Auto Racing, and some claim a gas station, among other things. 10

POLUTION OF THE LAKE

The DEIR does not address the tons of pollution, commonly referred to as industrial fall out, washing into the lake through the 42 plus, storm sewer inlets. It does not address how the lack of spending the money designated for these improvements is harming the environment. One need only observe the build-up of filth on the bright orange barricades at the South end of the lake to see that we have a major problem - that filth is washing into our waterways and we are breathing it daily. 11

MARSH LAND and WIND/WAVE ANALYSIS

The creation of the proposed marsh lands or tidal basin has not been adequately addressed in the DEIR. A creation of a marsh habitat is difficult at best and the vegetation does not survive at the low tide levels creating a smelly and unsightly "mud flat" below the anticipated marsh grasses. The colonization of cordgrass is assumed to be 4.5 (NAVD) MTL while the elevation for tidal wetland vegetation growth is assumed to be 6.2 (NAVD) (HHHW). In simple terms, there is a natural span, depending on the degree of slope, at low tide (where nothing grows) and the vegitation - the "mud flat" area. The aesthetics and other issues regarding the potential mud flats has not been addressed by the DEIR. 12

The wind at the South end of the lake and along the channel at times can be horrific. The reconfiguration of the roadways, widening of the channel, Construction of arch bridges, cutting of trees and other vegetation, will without question have an impact on the environment, the wave run up, etc. This has not been adequately addressed in the DEIR . 13

Water quality, wind, flooding, tree removal, traffic congestion creating excess pollution and dangerous multi-use paths (bicycle running into a baby carriage, etc.) are just some 14

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cont.

of the issues which have not been adequately addressed in the DEIR. **14 cont.**

As part of my comments I ask that other documents be reviewed and considered to be incorporated therein:

1) Lake Merritt Master Plan;

2) Port of Oakland Lake Merritt Greenbelt Feasibility Study (June 2002);

3) Thesis by Mary A. Travis, "A Historical and Environmental Geographic Analysis of Lake Merritt (1995); **15**

4) Alameda County Preliminary Design Study, Lake Merritt Flood Control Facilities (1966).

Respectfully submitted

David E. Mix

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Attach

Port *of* Oakland

Geomatics Group

QUALITY ASSURANCE

Bulletin No. 7

From the office of the PORT LAND SURVEYOR

September, 2001
Clarification

Information Management- Control Systems

Port of Oakland Vertical Control Datum

Definition: Port of Oakland Datum is 3.20 feet below N.G.V.D. '29

N.G.V.D.'29 is the abbreviation for the National Geodetic Vertical Datum of 1929, which is also known as the Sea Level Datum of 1929.

Since the Sea Level Datum of 1929 represents the mean of all of the individual tide stations up and down both coasts that were then projected across the continental United States as of 1929, many people still incorrectly refer to this datum as Mean Sea Level, although it was certainly true through the 1930's and 40's.

Today, on the other hand, Mean Sea Level is actually a site-specific datum that differs in actual elevation from one location to another. This is also true in San Francisco Bay. It takes 18.6 years for the Earth-Moon system to come back to the same mode, or start point in the solar orbit, from an orbital mechanics standpoint. This is known as the Metonic Cycle. This time cycle generates the total length of time, or duration, over which a tide gage has to be read at regular intervals in order to establish a particular tidal datum in any one location. Every 19 years (or there abouts), the National Geodetic Survey (N.G.S.) re-adjusts and re-publishes tidal data for all of the recording tide gage stations that are maintained by the National Ocean Survey (N.O.S.).

These adjustments have occurred three times since 1929. Each individual tide gage station has a specific published tidal datum relative to N.G.V.D.'29. Although N.G.V.D.'29 remains constant, the datum has not been readjusted since 1929.. So Mean Sea Level has been steadily rising since 1929 and now MLLW is up to 0.42 feet higher than Port of Oakland Datum, which was Mean Lower Low Water back in 1929, but not anymore. Nor is N.G.V.D.'29 correctly referred to as Mean Sea Level either. Not just a question of poor practice, the reference is actually a blunder.

We think that N.G.S. will publish new adjustments soon, but they have already abandoned the N.G.V.D.'29 Datum in favor of the North American Vertical Datum of 1988 (N.A.V.D.'88). We are working on a conversion, but we will not be ready to present any credible evidence to the organization this year. There is a sense of urgency, but not a real dramatic one. Senior Engineering Management will make the decision to adopt the new datum or keep the old one. We expect that process to play out in 2002, which is when we expect to present our conversion data.

If Senior Engineering Management elects to adopt the new datum, we will then define Port of Oakland datum in terms of N.A.V.D.'88, instead of N.G.V.D.'29. If or when that happens, we will publish a new Bulletin.

Additional References:

Biennial Vertical Control Report, Harbor Areas *1998*

Related Bulletins:

Bulletin No. 6

For general questions regarding Vertical Control issues, contact Daniel Walker at 627-1613.

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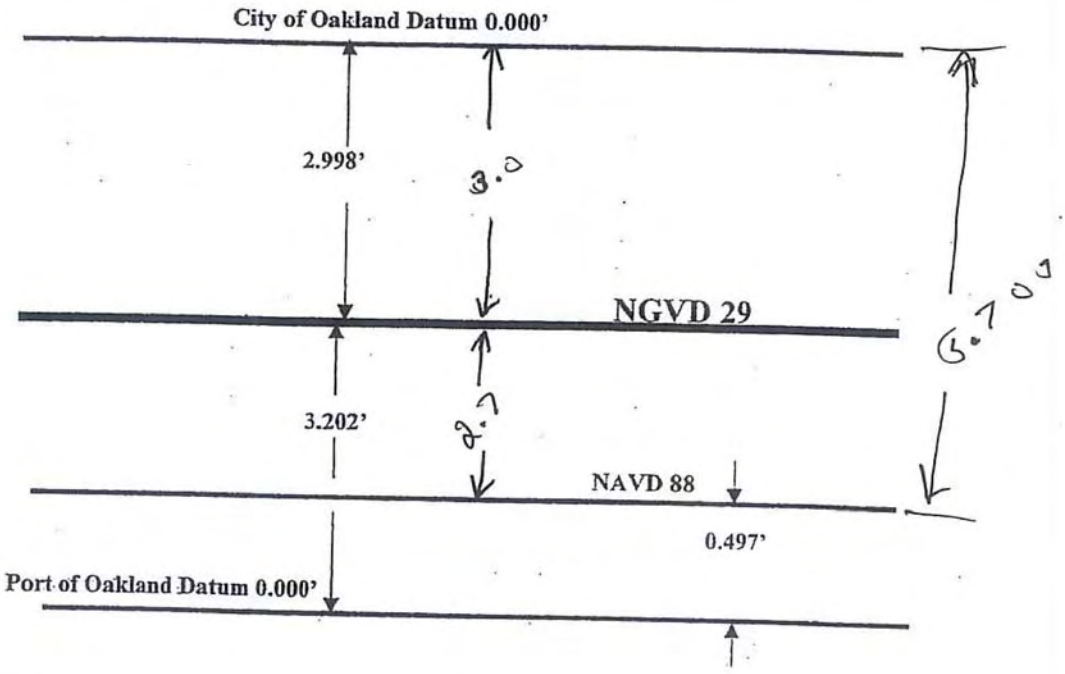
VERTICAL DATUM DIAGRAM[1]

Local Agency sponsored datum of the City of Oakland and the Port of Oakland To the old NGVD'29 and to the modern NAVD'88



[1] Units are in U.S. Survey Feet

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PHOTOGRAPHS taken during the flood of October 13, 1962 were used to establish maximum water elevation

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PEAK STORMWATER FLOWS sometimes coincide with high tide levels with resulting flooding of areas adjacent to Lake Merritt October 13 1962

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LAKE MERRITT and CHANNEL TIDE ELEVATIONS	City of Oakland Datum	North American Vertical Datum 1988	National Geodetic Vertical Datum 1929
	(COO)	(NAVD88)	(NGVD29)
Highest recorded - Oct. 13, 1962	4.30	10.00	7.30
Turfed area flooded	4.00	9.70	7.00
100 year flood	3.20	8.90	6.20
Lakeshore flooded	3.00	8.70	6.00
25 year flood	2.20	7.90	5.20
	2.00	7.70	5.00
	1.00	6.70	4.00
MHHW (Estuary)	.54	6.11	3.41
Shoreline walkways flooded	-0-	5.70	3.00
Ideal recreation level	-.50	5.20	2.50
MHHW (Lake)	-.90	4.60	2.10
	-1.10	4.70	2.00
	-2.00	3.70	1.00
MLLW (Lake)	-2.20	3.50	1.80
	-3.00	2.70	-0-
	-4.00	1.70	-1.00
	-4.70	1.00	-1.70
	-5.00	.70	-2.00
	-5.70	-0-	-2.70
MLLW (Estuary) and BART tunnel	-6.00	-.30	-3.00
EBMUD 84" Sewer interceptor	-6.57	-.87	-3.57
7th st. Pump Station "rock guard"	-6.63	-.93	-3.63
	-7.00	-1.30	-4.00
	-8.00	-2.30	-5.00
	-9.00	-3.30	-6.00
	-10.00	-4.30	-7.00
Bottom of Lake (at center)	-9.70	-4.00	-6.70
Bottom of floodgate culvert	-13.97	-8.27	-10.97

Notes!

(NGVD) elevations also known as (SLD29) Sea Level Datum
(MHHWL) Mean High High Water Level
(MLLWL) Mean Low Low Water Level

D.E. Mix Sept. 11, 2007

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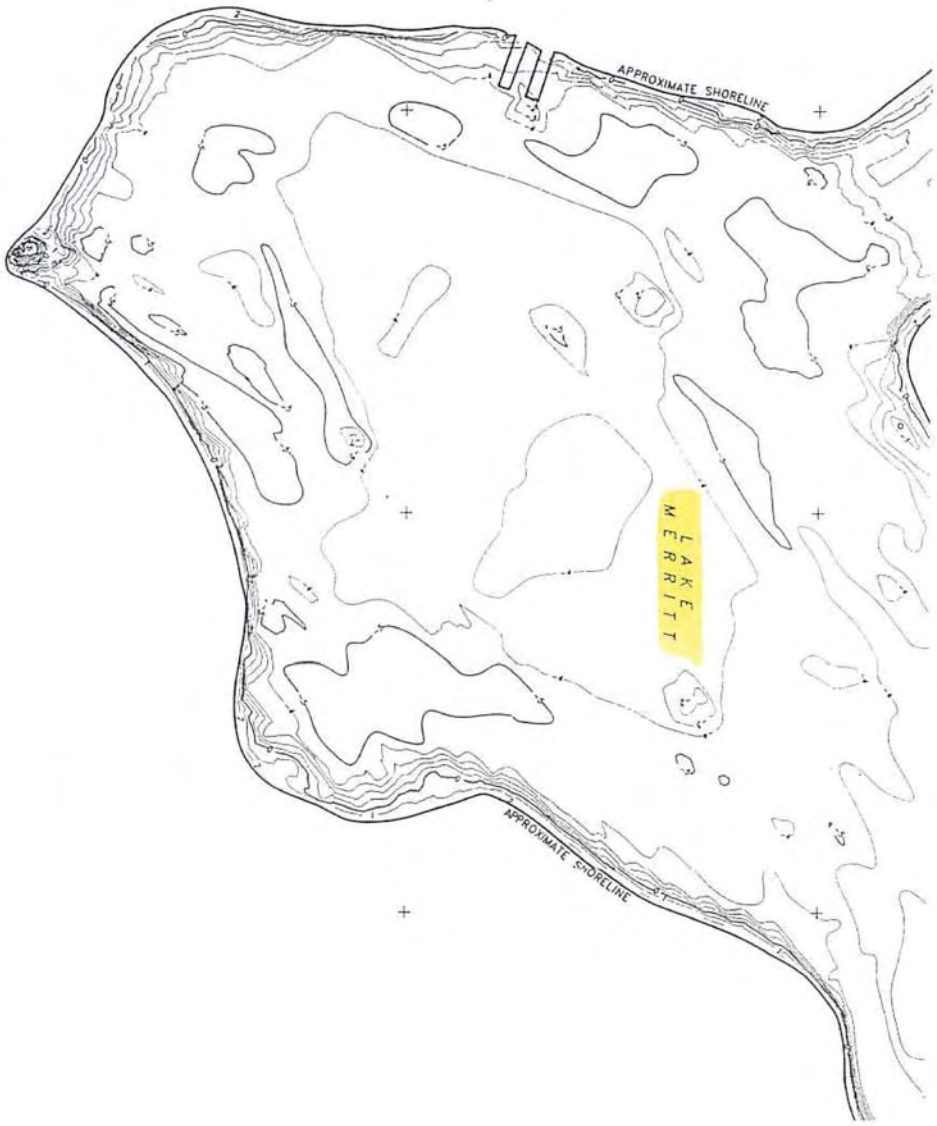

LAKESIDE PARK

100/F "Sta 100 Sec. F"
N=2120523.64
E=6053876.71
EL=16.82 NAVD88

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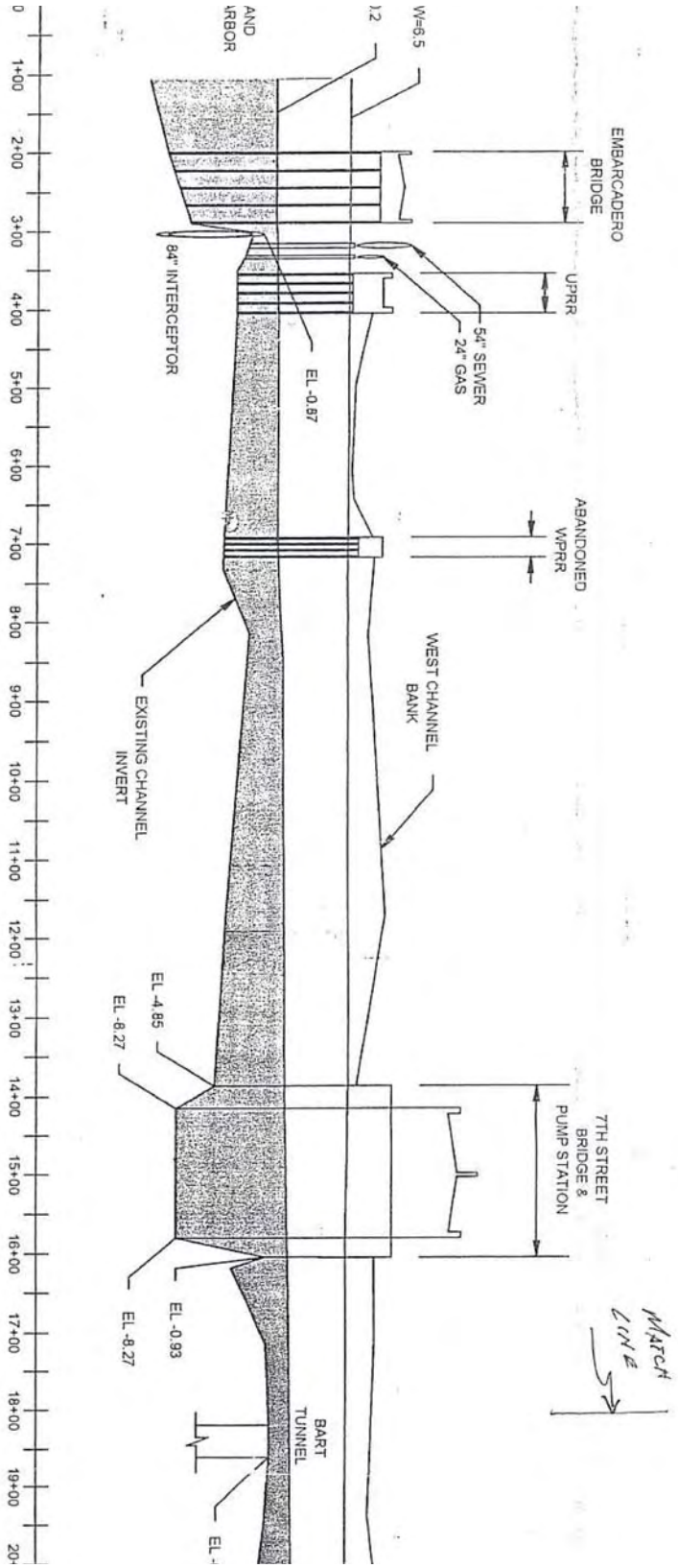

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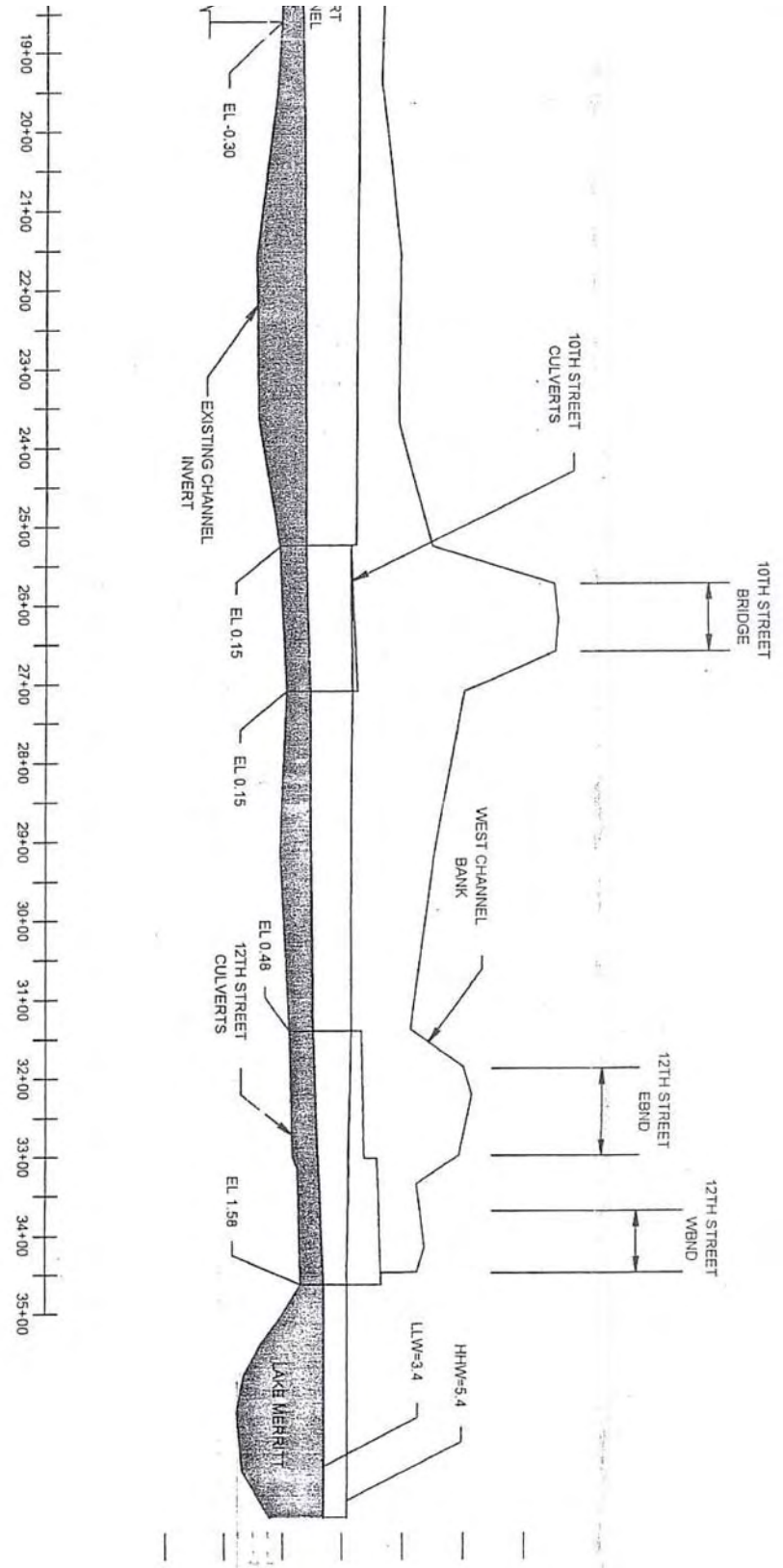

Page 2

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LETTER B11
David E. Mix
September 13, 2007

Response B11-1: The introductory statements to the comment letter are noted. The specific issues raised in the introductory statements are addressed below as follows:

- Hydrology and flooding (Refer to Responses to Comments B11-3 to B11-9)
- Contaminated soils (Refer to Response to Comment B11-10)

Although the introductory statement indicates that the letter would also raise concerns about traffic, tree removal, safety, open space at the boathouse, public access and public restrooms, no specific comments were provided in the comment letter.

Response B11-2: The comment, which describes some of the history of Lake Merritt and establishment of the wildlife refuge, does not pertain to the environmental analysis of the Draft EIR.

Response B11-3: MIKE 11 is an industry standard software package developed by the Danish Hydraulic Institute. It is used for simulating flow and water level, water quality and sediment transport in rivers, flood plains, irrigation canals, reservoirs and other inland water bodies. The software package is proprietary but additional general information about it and its application are available on various websites, including the United States Geological Survey (http://smig.usgs.gov/SMIC). The models and conclusions of the hydraulic studies for the Lake Merritt Channel were reviewed during preparation of the Draft EIR and found to be adequate for the purposes of determining the significance of impacts related to the hydraulics of the Lake Merritt Channel. The hydraulic (flooding) analysis in the Draft EIR is consistent with *CEQA Guidelines* Section 15151, which requires an EIR "to be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. . . An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible." The analysis and discussion in the Draft EIR of the potential flooding effects on pages 261-264 of the Draft EIR provide decision-makers with adequate information to enable them to reasonably understand the project's impacts.

Response B11-4: The Draft EIR relied upon available hydraulic modeling studies and reports for the Lake Merritt Channel (cited in the Draft EIR and available at the City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315) and found them adequate for purposes of analyzing the effects of the project. The information provided by the comment does not affect the analysis or conclusions of the reports upon which the Draft EIR

relied. The reports took into account the relevant parameters needed to run the hydraulic model for its intended purpose, including culvert sizes and elevations (although these are not relevant for project conditions at 10th Street and 12th Street where the culverts would be removed and the Channel depth lowered). The removal of the culverts at 10th and 12th Streets and lowering of the Channel at these locations will improve flows (and ameliorate flooding conditions) because these actions will remove a constraint to the flow of water between Lake Merritt and the 7th Street Pump Station. Other information cited in the comment applies to areas downstream of the 7th Street Pump Station and outside the scope of the project.

Response B11-5: The hydraulic analysis concludes that the EBMUD 84" interceptor and the BART tunnel are not the most critical elements to water flow in the Channel. Modifications to these structures, which might improve tidal flushing very slightly, are not funded by Measure DD and no known projects are being proposed to modify these structures.

Response B11-6: The comment describes a hydraulic study prepared by URS that is cited in the Draft EIR and available at the City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315. The comment states that the study indicates flooding occurs under existing conditions at various locations around the lake and could occur under a variant to the project provided in the comment. The Draft EIR acknowledges that flooding occurs in Lake Merritt and concludes that the project would have the beneficial effect of alleviating flooding conditions (page 261 of the Draft EIR) The variant, which has not been carried forward in the project design process, is not analyzed in the Draft EIR. As no significant impact related to flooding in Lake Merritt was identified in the Draft EIR and the variant would not relieve flooding in any case, the information provided does not change the analysis or conclusions of the Draft EIR.

Response B11-7: The comment, which describes the history and purpose of the 7th Street Pump Station and flood control facility, is noted.

Response B11-8: The comment describes some aspects of the operation of the 7th Pump Station. It incorrectly states that "…the County is capable of establishing the Lake at any level, at any time, or on any giving [sic] day the City may desire." As the 7th Pump Station is a flood control facility, the County is obligated to operate it for that purpose.

Response B11-9: Flooding is addressed in Section IV.H, Hydrology and Water Quality of the Draft EIR on pages 244, 246, 247, 249, 252, and 261.

Response B11-10: The comment incorrectly states that the Draft EIR doesn't address possible contaminated soils and that a review of past activities related to hazardous materials has not been conducted. Such studies have been conducted and are described on pages 287-292 of the Draft EIR. Where historical evidence indicates that sampling and analysis of soils or other environmental media are warranted to

determine if contamination is present, samples have been collected and analyzed or will be prior to construction in accordance with the City's Conditions of Approval 50 and 52 as stated on pages 303-305 of the Draft EIR.

Response B11-11: The project includes many elements that are intended to improve water quality in Lake Merritt. These are listed in the Project Description on pages 48-51 of the Draft EIR. Among these improvements are storm water separators, drain inlet inserts, netting trash traps and booms, all of which would reduce the "filth," presumably debris, sediments and other storm water pollutants, that the comment cites as a concern.

Response B11-12: The comment incorrectly states that aesthetics and other issues regarding the proposed wetlands have not been addressed in the Draft EIR. The created wetlands are described on page 35 and depicted in Figure III-4 of the Project Description. Aesthetics and odor issues associated with the project are identified and evaluated in Sections IV.D, Air Quality and IV.M, Aesthetics. The wetlands would support both vegetated and non-vegetated habitat (mud-flats) as a resource for wildlife. The lack of vegetation in some areas is expected to attract shorebirds and other wildlife, which most observers would not describe as unsightly. The wetlands would have a localized odor, if any, typical of other tidal areas in the vicinity and around the Bay. This would not be considered a significant effect under the City's criteria of significance.

Response B11-13: Wind acceleration is an environmental issue under certain conditions when tall structures are introduced into the environment. For this reason, the City of Oakland has developed a significance criterion for projects that might create winds exceeding 36 mph for more than 1 hour during daylight hours during the year. The wind analysis only needs to be done if the project's height is 100 feet or greater (measured to the roof) and one of the following conditions exist: (a) the project is located adjacent to a substantial water body (i.e., Oakland Estuary, Lake Merritt or San Francisco Bay); or (b) the project is located in Downtown. No analysis is needed for the proposed project because it would not erect a structure 100 feet tall or greater.

Response B11-14: The issues cited by the comment have been addressed in the Draft EIR or would not occur as an effect of the project (i.e., wind, refer to Response to Comment B11-13). Water quality and flooding are addressed in Section IV.H, Hydrology and Water Quality, tree removal is addressed in Section IV.F, Biological Resources and Section IV.M, Aesthetics, traffic, pedestrian and bicycle safety issues are addressed in Section IV.C, Transportation, Circulation and Parking.

Response B11-15: The cited documents were not submitted with the comment letter and the comment does not indicate what specific information in these documents he finds relevant to the environmental analysis. The Lake Merritt Master Plan was considered during the environmental analysis of the Measure DD Implementation Project. It is cited in the Draft EIR and available at the City of Oakland, Community and Economic Development Agency, Planning and Zoning Division,

250 Frank H. Ogawa Plaza, Suite 3315. Several attachments to the comment letter (the Port of Oakland Vertical Datum bulletin, photographs of the 1962 flooding near Lake Merritt, and cross-sections of the Lake Merritt Channel) are noted. The attachments do not contain information pertaining to the environmental analysis of the Draft EIR.

Letter
B17

01-11-07

John WILSon

CITY OF OAKLAND

EQUAL ACCESS ORDINANCE

Final comment

Please Include Lake merritt master Plan in DDEIR.

MAÃU ÑÔN KHIEÁU NAÏI (Tieáp theo)

Chæ Daønh Cho Ban Söû Duïng

Xin cho bieát tröôøng hôïp khieáu naïi naøy ñaõ ñöôïc giaûi quyeát nhö theá naøo:

IN REGARDS TO DD ENVIRONMENTAL IMPACT REPORT(EIR).

Please read Lake Merritt ~~Plan~~ Park master Plan. Published July 2002.

(JW)

SPECIFICALLY:

Pages: Including

(JW)

& Section 3 Pages 29 Thru ~~55~~ 55

Please answer why oakland can not Follow The outline Sugested in the Lake Merritt Park master Plan. Specifically in Regards To Tree management, OF The oldest designated Wildlife Sanctuary in The United States.

Ngöôøi Lieân Laïc/Chöùc Vuï: _____

Ñieän Thoaïi Ban Ngaøy: ( ) _____

Moãi Ban/Cô Quan phaûi löu moät baûn sao cuûa thö khieáu naïi trong it nhaát 3 naêm. Xin göûi moät baûn sao cuûa thö khieáu naïi ñaõ noäp cho Vaên Phoøng Bình Ñaúng trong vieäc Söû Duïng Dòch Vuï (Equal Access Office) trong voøng 30 ngaøy keå töø ngaøy nhaän ñöôïc khieáu naïi.

Xin Göûi Maãu Ñôn naøy tôùi: CAO-Equal Access Office, 1 Frank H. Ogawa Plaza, 3rd floor, Oakland, CA 94612

Please Publish Pages From the Lake merritt master Plan Including Section III-29; III-30; III-32; III-34; III-35 III-37. Do not limit The EIR To these Pages.

CAOeao0707aV1

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attach.

Cultural Landscape

- In the 1870s, the area, then pristine, was inhabited by a handful of settlers and a few Costanoan (Ohlone) and Miwok Indians. At the head of the slough (the present location of the Grand Lake Theater) was a pier operated by the Peralta brothers for boats transporting timber or cattle products to the bay.
- In 1909, during Mayor Frank Mott's tenure, Oakland acquired the entire lake frontage, set up the first Park Commission and began to develop Lakeside Park. The Embarcadero area including Trestle Glen Creek and Lakeshore Avenue to Park Street had wooded creek land, spacious upper areas, natural and historic oak trees. Between 1907 and 1912 the road around the Lake was paved, the boathouse and canoe house were built, a boat landing was created and the Camron-Stanford house was acquired for the new Oakland Museum
- In 1909, the architect Oscar Praeger was asked by Mayor Frank Mott to design parts of the existing landscaped 45-acre Lakeside Park. Preliminary ideas included the original bowling green and fountain site, augmented by live oaks with deciduous oaks, (Quercus cerris, rubra and coccinea), groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries.
- Trees were added from the 1915 World's Fair held on Treasure Island. At one time, a conservatory similar to the Conservatory of Flowers in Golden Gate Park existed on Adams Point in Oakland.
- The original lights, which are today a landmark, were installed in 1925 by consulting electrical engineer, Romaine W. Myers. The "Necklace of Lights" referred to the 128 electroliers installed along the shoreline and the "Festival Lights" were the strings of lights suspended between temporary poles and the electroliers. The circuit included 3,400 lights. In 1946, a Dr. Brown bought the discarded "Festival Lights" from a junkyard and they ended up lighting a mission, mission hospital and nearby villages close to the City of Swatow, China.
- Fairyland was built in the 1950s and reputedly served as the inspiration for Disneyland. The architect of approximately 50 of the original structures was William Russell Everritt. Approximately 60 settings based on fairy stories and Mother Goose rhymes form the pioneering playground. Currently, the non-profit entity run by Nancy Stark has renovated the gardens, entry and oversees educational programs. New programs will include a reading and learning program for preschool children and a volunteer gardener's docent tour of the Fairyland grounds. Mapping and plant collection lists exist for the Fairyland grounds.
- In November 1999, the one-third-acre Bonsai and Suiseki Display Garden opened. This nationally known collection of precious trees and stones includes a display booth, a fence surrounding the bonsai collection with entry gate, volunteers' office, display building and future workshop. It serves as the open-air cultural museum of the Golden State Bonsai Federation Collection - North. Many bonsais, by outstanding masters and collectors, have been in families for 20, 30 or 40 years. A special 400-year Japanese black pine bonsai was part of the 1915 Pan Pacific Exposition in San Francisco.

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attach.

PARK LANDSCAPE

Figure III.24 Existing Vegetation

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attach.

Vegetation Survey and Analysis

A tree survey was conducted, which identified a wide variety of planting in Lake Merritt Park and served as the basis for the Existing Vegetation Plan. Vegetation is classified into the following zones:

- Coastal bluff plant communities
- Fenced area (Fairyland and Botanical Garden)
- Mixed oak woods
- Mixed pine woods
- Groves of other trees
- Flowering ornamental trees (accent)
- Street trees
- Lawn
- Significant and historic trees

Historic trees are those planted after the 1915 World's Fair and/or trees referenced in Praeger's original planting design, such as the New Zealand Tea trees. These trees were identified largely from early writings and plans. Some trees have been newly planted (replacing those diseased), but there has been much resistance to planting trees because some residents prefer to preserve their view of the Lake. There was a large planting of ornamental cherry trees during the 1950s, but many of the trees were vandalized.

Significant trees are those trees that have grown to a large specimen size and/or trees or groves of trees that form a special, sanctuary space. Specimen trees include some specific trees within the Botanical Garden that were identified as "thriving" in the East Bay but not in San Francisco.

Lawn occurs predominantly in areas without trees as well as areas under trees. The planting slope to the west of Fairyland was once groundcover, but due to lack of maintenance, a rodent population became problematic.

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PARK LANDSCAPE

Landscape Themes

Bio-diversity

The Landscape Plan will focus on enhancing the biological diversity and variety of life at Lake Merritt Park. Lake Merritt is the first wildlife refuge declared in the United States. The challenge is to enhance this wildlife refuge within an encroaching urban environment while responding to increasing human recreational demands. The Landscape Master Plan builds upon the existing wildlife habitat and park, offering a wide range specialty plants and environments. Restoring lost vegetation such as oak trees along the narrow vegetated perimeters of the Lake will provide a wider range of habitat and wildlife corridors to balance plant, animal and human needs.

Multiculturalism

Building upon the multicultural theme, development of the Botanical Garden extensions beyond the fenced gardens will capitalize upon the existing plant collections. Low groundcover massing of plants such as Hemoracallis and Phormium tenax will provide hardier theme plantings beyond the fenced areas. These plants will be selected from the Mediterranean climate, African continent, temperate and mild temperate climates of Asia and Australia, tropical climates of New Zealand, native Bay Area habitats and drought-tolerant species.

The drought-tolerant garden will combine plants from all areas to provide a design theme based on form, shape, color and textures. The Botanical Garden extensions (approximately 20-45 acres) will provide seamless landscape transitions and add to the overall landscape character of the Park. Educational themes of the Botanical Garden will stress the ecological values of plants such as low water usage. In keeping with historic precedent, New Zealand tea trees (Leptospermum), "whose branches, as noted in early writings, "will droop into the lake and give a most pleasing effect," will be planted as accents along the bulkheads and at the gateway entries into the Park.

Ecological Systems

Prior to the 1909 Park plantings, the existing site supported groves of oaks and a few buckeye trees. Today striking specimens of this period still exist and add to the rarity of the Park's collection of trees. The Landscape Plan extends clusters of Valley and Blue Oaks along the Lakeside and Lakeshore portions of the Park where site conditions permit.

Low groundcovers under oak trees will provide native oak woodland habitat for plant and animal species and reduce maintenance. A balance of open lawn areas and groundcover areas will help to restore bird and animal resources.

Along the Ecological Zone a restored tidal marsh is envisioned, consisting of upland and wetland habitat and vegetation. In the Ecological Zone Area, the water's edge will be supplemented with wetland plants to enhance bird habitat. The walkway will be pulled back from the water's edge to allow more extensive wildlife habitats, similar to those existing prior to the undergrounding of creeks and damming of the estuary, and to provide more natural viewing areas for people.

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Riparian Corridors

The large arterial streets surrounding Lake Merritt follow the route of the four creeks that formerly drained into the Lake Merritt estuary: Trestle Glen Creek (Grand Avenue / Lakeshore Avenue), Glen Echo Creek (Harrison Street), Park Boulevard Creek (Park Boulevard- Foothill Street) and San Antonio Creek (12th Street). Current conditions along these former riparian corridors are as follows:

- Trees along Grand Avenue are London plane trees with limbs pruned back. Past the freeway the trees are evergreen flowering pear trees. Foothill Street has London plane trees in the street median and scattered trees and vegetation in Athol Park and along the sidewalks.
- Many of the existing plantings along these streets are an accumulation of smaller landscapes and not part of a large cohesive design theme. Scattered trees exist along both Lakeside Drive and Lakeshore Drive.

In order to visually recall the former creeks, riparian planting is proposed along these corridors, as outlined in the following table.

Botanical Name	Common Name	Comments	Habitat
TREES			
Platanus racemosa	*California Sycamore*		X
Alnus rhombifolia	*White Alder*		X
Acer macrophyllum	*Big Leaf Maple*	where conditions permit	X
Salix babylonica	*Weeping Willow*	where conditions permit	
SHRUBS			
Calycanthus occidentalis	*Spice Bush*		X

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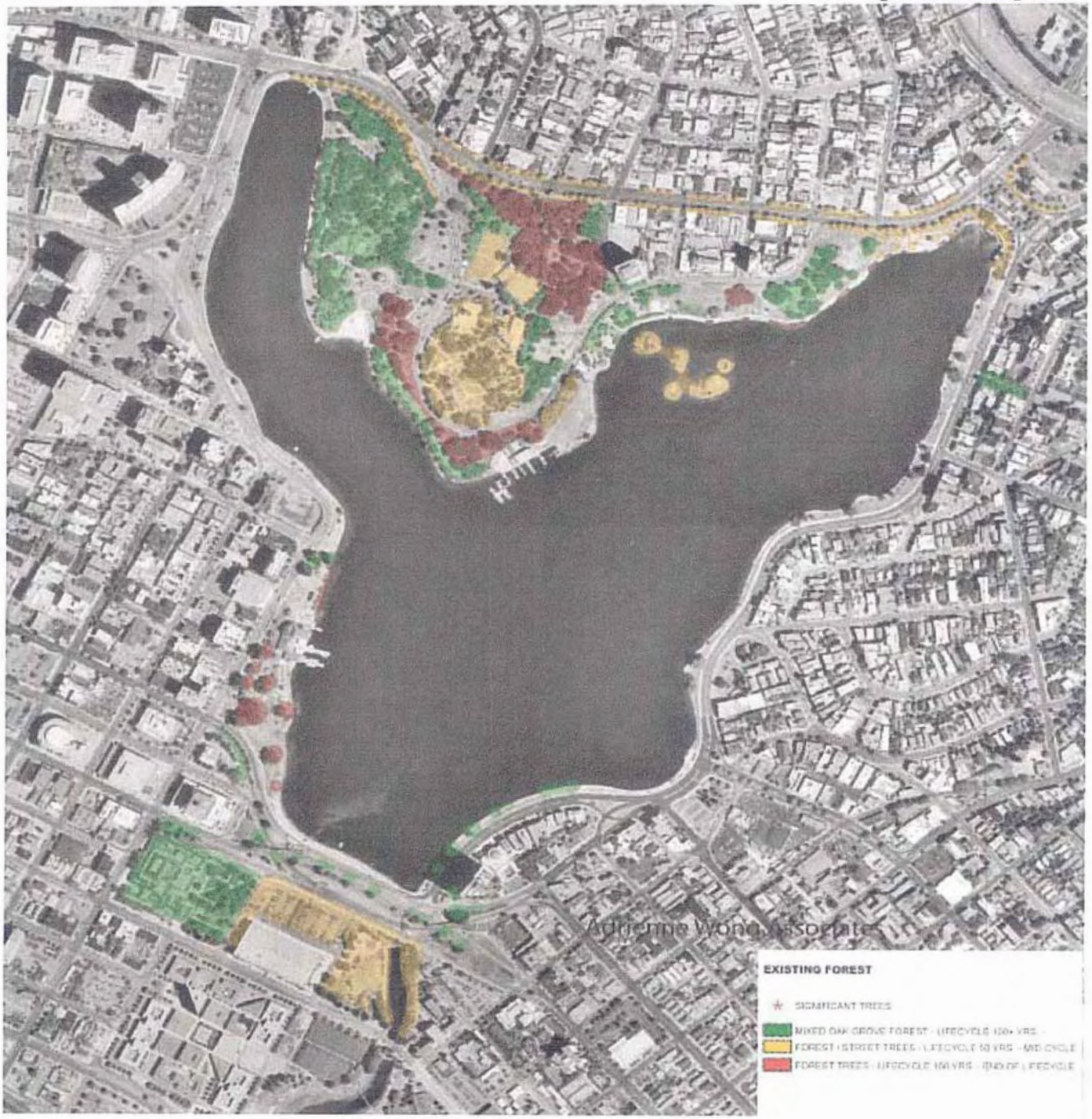
PARK LANDSCAPE

Figure III.25 Existing Forest



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Urban Forestry Program

Existing Conditions

Lake Merritt Park provides the City of Oakland with a signature urban forest in the heart of downtown Oakland, including many historic and heritage category trees, such as oaks, California buckeyes, and New Zealand tea trees. In general, trees in Lake Merritt Park (including Lakeside Park) fall into the following three groupings:

1. Grown prior to European settlement (1800s) - including scrub oaks and woodland oaks (Quercus agrifolia, Quercus kellogii, Quercus douglasii).
2. Planted from 1909 through 1915 - including deciduous oaks, Quercus cerris, rubra and coccinea, groups of pines (Pinus austriaca) and birches (Betula alba), madrones and flowering cherries. Included are specimen trees from the 1915 World's Fair.
3. Planted to replace diseased trees and sporadic plantings from 1950 to present.

Many of the Park's trees are at the end of their life span; the age of most forested sections of Lake Merritt is 87 years. Overmature trees are susceptible to pests and diseases, wind damage and hazardous weakening effects. Reforestation efforts need to be more aggressive to sustain the value of this urban forest and its wildlife and recreation value to the City of Oakland.

A comprehensive forest-management program is needed. New trees have only been sporadically planted largely due to the political climate of preserving views of the Lake. On a larger scale, it must be recognized that these forests also support a wide range of wildlife and will need to be replanted for wildlife habitat. New trees have not been routinely planted to offset the aging of the forest. Very few trees have been planted along the eastern, western and southern shores of the Lake. Luckily many of the oak trees have a longer life span. However, the effects of new oak diseases have not yet been clearly considered.

Goals

A reforestation program should be established that operates at a 25-30-year replacement cycle and includes the eastern and western shores as defined in the Landscape Plan. Consistent with the Existing Vegetation Plan, reforestation would serve the following goals

- Aesthetic - framing vistas, defining open spaces, including areas of smaller parks in Lake Merritt Park (i.e., Pine Knoll Park), accentuating riparian corridors (gateways), and providing color and visual accents.
- Habitat - multi-story landscape providing a diversity of habitat, food sources and canopy.
- Boulevard street trees - providing a border and extension of the Park boundaries beyond its present edge.

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PARK LANDSCAPE

Forestry Recommendations

Specifically, the reforestation program should include the following elements:

- Public Information: Provide the public with information about the reforestation project and process through informational brochures and signs at the sites and at the Rotary Nature Center.
- Native Plant Preservation: Preserve the remnant native plant population, especially the oaks and California buckeyes. Educate the public that this is an oak preserve and that other oak areas will be re-established in the historic areas such as Lakeside Drive, Lakeshore Drive and the 12th Street Peralta Park areas. Prepare gateway areas for Riparian-native populations and replanting at the gateways of El Embarcadero - Eastshore Park, 18th Street, Harrison - Adams Park area, and the Estuary Channel area.
- Specimen Tree Replacement: Replace individual large trees in kind, with similar species, such as the Italian stone pines along the promontory in Lakeside Park. Other large trees such as the California buckeye could be planted around the Bandstand areas. The New Zealand tea trees and the Auraucaria tree outside of the Botanical Gardens should be identified and addressed in replacement cycles.
- Reforesting High-Use Areas: Reforest high-use and high-visibility areas in Lake Merritt Park (Boathouse, Sailboat house, Tropical Garden area, New Promenade area, Duck Pond Feeding area, etc.) with larger trees rather than seedlings. Options include using trees being removed by the tree-spade method and moving them to new sites.
- Tree Maintenance: Provide ongoing maintenance of structurally weak trees that present risks to the health and safety of the public and property. These need to be identified, monitored and removed as an ongoing safety program. The Arborist Division of the City of Oakland is addressing safety issues but is in need of more current databases and tracking systems as afforded by a GIS tree system.
- Reforesting Plant Communities: Use species and forest communities similar to those identified in the Existing Vegetation Survey and Analysis. For example, Coastal Bluff plant communities should utilize a range of species similar to those found within the existing plant community.

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Construction Coordination with Wildife

Timing of construction can have a major impact on the wildlife and habitats in the area. Different components of the new park developments should be planned and timed to ensure that any negative impact is minimized, e.g., avoid lopping trees when birds are known to nest during breeding seasons.

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PARK LANDSCAPE

Visual Analysis

12th Street Panorama

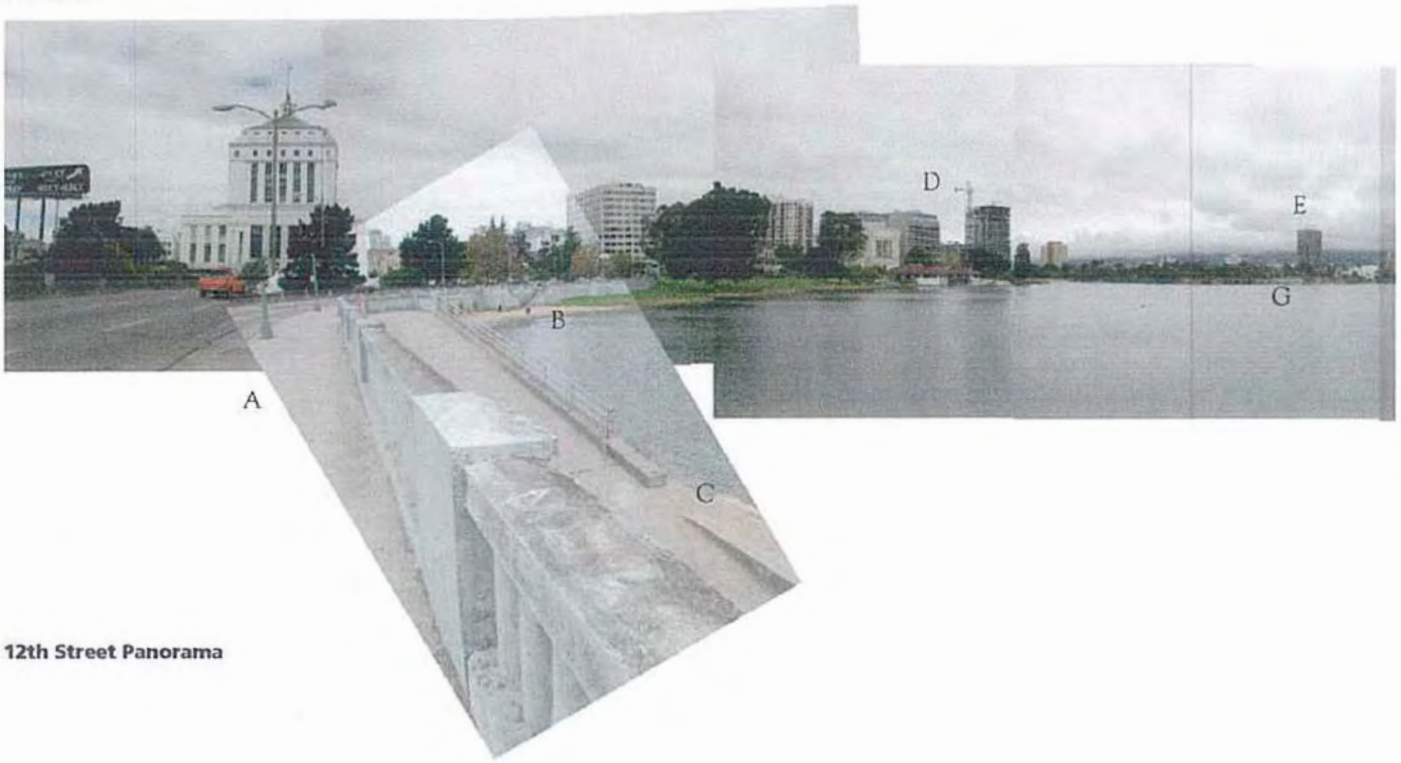
The 12th Street panorama provides many opportunities for interpretive art. The view to the north provides views of the Oakland hills and part of the watershed for Lake Merritt. There is one large building that mars the low, mass of buildings with the Oakland hills beyond. The Park portion of land is narrow and the promenade continues along the 12th street "short freeway." This is the site where the estuary water entering and exiting the Lake can be defined. It is also the historic site where the first bridge—Bridge of Sighs—connected the old township of Brooklyn and Oakland. It has a colorful history that can be interpreted here. This portion also links the Lake with Kaiser Convention Center, the Oakland Museum and Laney College. To the west is the Fire Alarm building. This site can be improved with more civic uses and landscape - park connection to the Lake.

A. Fast-moving vehicular traffic conflicts with pedestrian, bicycling activities or crossing to Kaiser Convention Center area. Provide elevation or landscape separation experience to buffer from vehicular traffic.

B. 30' to 40' wide beach at low tide used for two regattas, in July and October.

C. High tide - narrow path to ramp access. Ramp is not to ADA codes. Second area where public can contact water's edge / lake water.

D. High-rise building can frame views across the Lake, however their mass can be imposing and unattractive. Higher degrees of facade articulaiton are desirable.



12th Street Panorama

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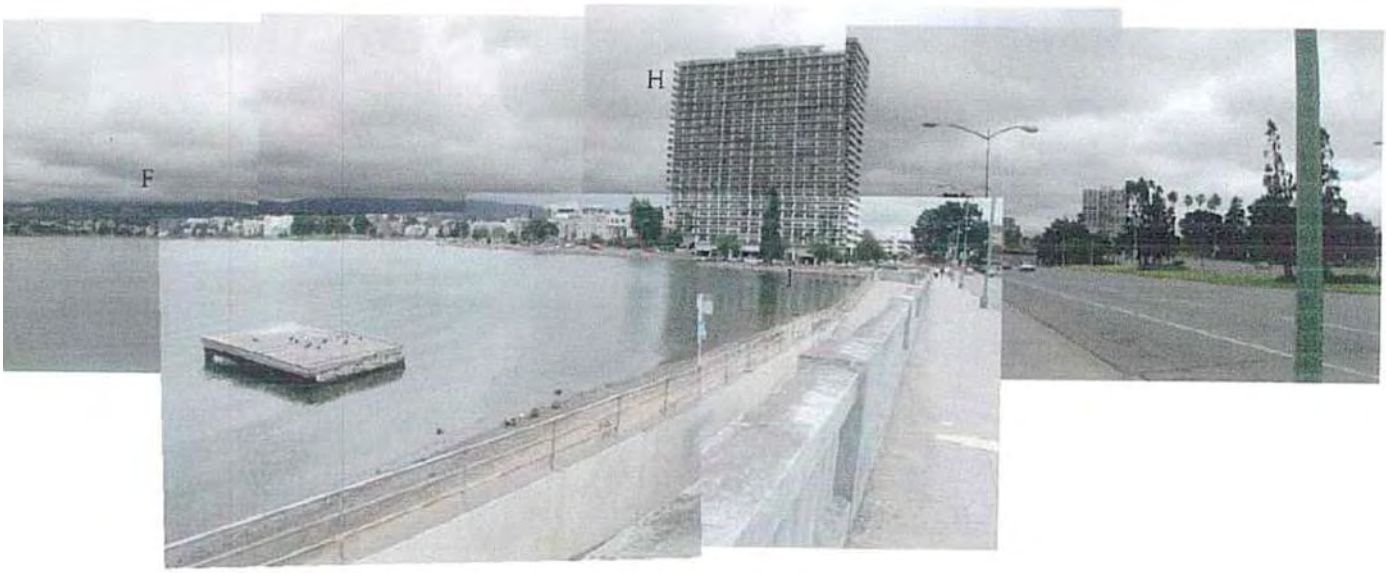
E. Few high-rise buildings on hill preserve Oakland Hills views.

F. Positive view of Oakland hills. Maintain low building heights to preserve view of Oakland hills beyond.

G. Views of sailboats and opposite shores.

H. High-rise building frames view.

I. Saltwater inflow opportunity to make tides readable.



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PARK LANDSCAPE

Snow Park Panorama

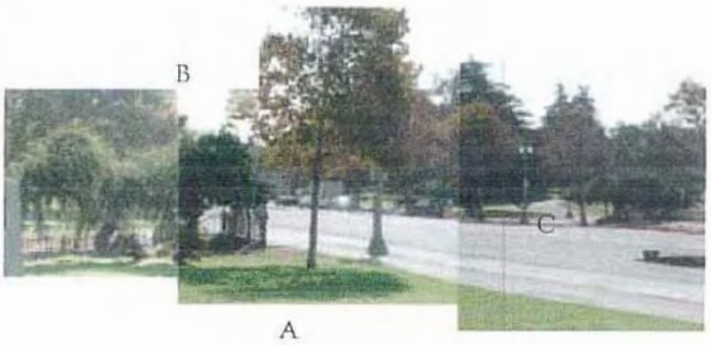
Snow Park panorama provides a large park space for commercial office workers. The expansive lawn is sometimes used by geese and their feces remain. The lawn provides a sweeping view up to the Lake with water barely visible through the park setting of mature trees. Lakeside Park looks very wooded. Additional siting of trees can visually screen the two predominant high-rises from this view. This park is a vital pedestrian link between the commercial downtown area and Lake Merritt.

A. Light standards create visual "noise" and clutter.

B. Cedar trees provide evergreen screening of buildings.

C. Good landscape views of Lake Merritt, trees and banks from Snow Park.

D. High-rise building diminishes view. Provide additional evergreen trees for screening.



Snow Park Panorama

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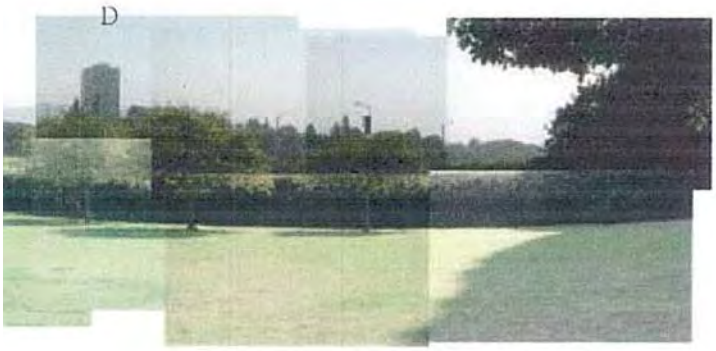
Grand Avenue Panorama

Grand Avenue Panorama

From the Grand Avenue panorama, the lawn groundcover creates a strong and positive horizontal band, extending the Park and providing visual respite from the built environment. Trees and landscape fronting the tall apartments and high-rises add significantly to the "extension" of the Park and increases the Park's apparent size. The commercial high-rises form a strong edge that is softened on the east side by the Park trees.



A. Open lawn area.

B. Mature New Zealand Tea trees have specific pruning requirements. Only a qualified arborist should prune them since damage done by inappropriate pruning will kill trees. Veteran's Memorial Auditorium Grove provides good specimens of New Zealand Tea trees that have not been damaged.

C. Lawn groundcover provides positive horizontal view.

D. Trees and landscape fronting tall buildings provide visual extension of park beyond park boundaries.

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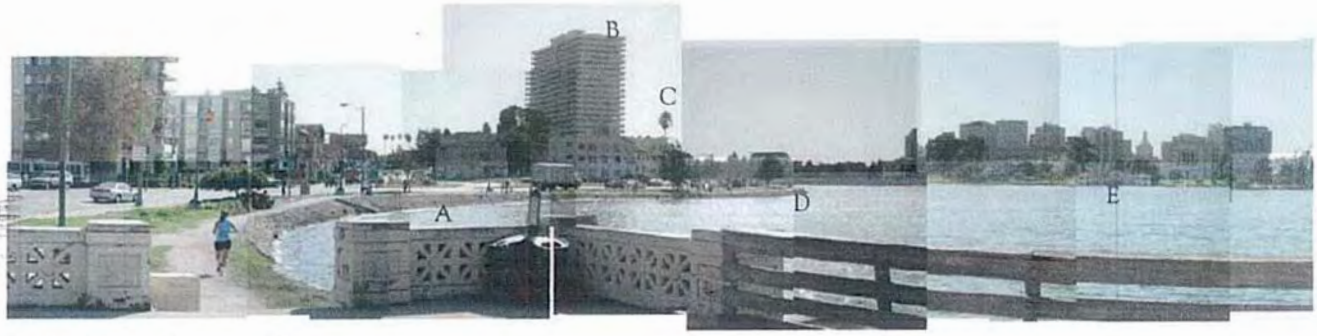
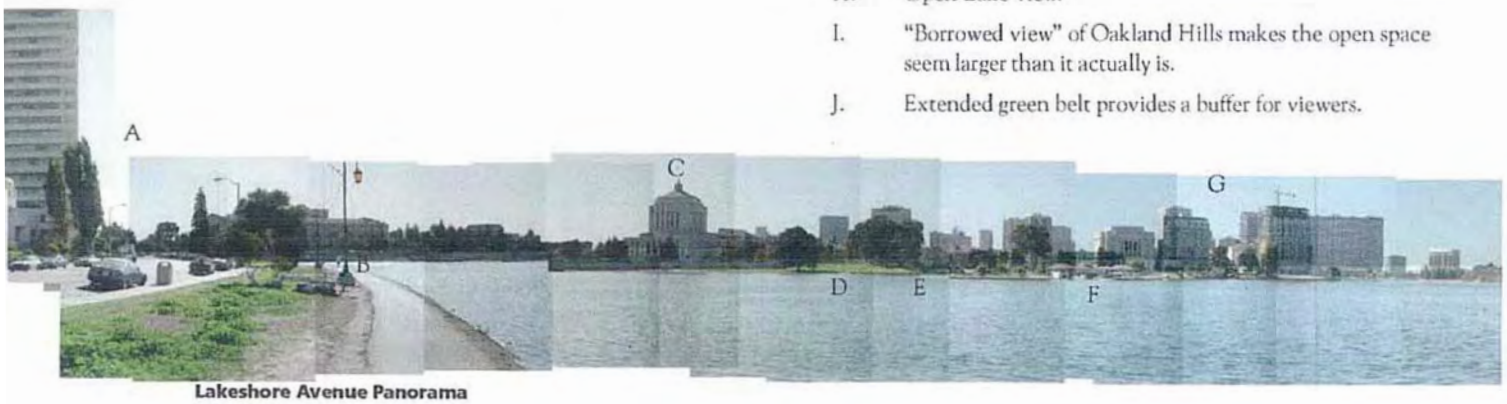
PARK LANDSCAPE



Lakeshore Avenue Panorama

Lakeshore Avenue panorama has an open feeling. There are few trees lining the Park boundary at this location. The large apartment building to the south is less intrusive at this point and probably provides residents with striking views of the Lake. From this vantage point the Federal Courthouse is visible. The Lake appears very large with a built skyline to the southwest and the Oakland hills to the northwest. The Park appears most narrow at this panorama.

A. View of apartment building's narrow side is less intrusive.
B. Retaining wall with no landscape.
C. Federal Court House.
D. Sunny open lawn area.
E. Historical Cameron Stanford House.
F. Park setting around Boathouse.
G. 19th Street skyline provides a backdrop of the Lake view.
H. Open Lake view.
I. "Borrowed view" of Oakland Hills makes the open space seem larger than it actually is.
J. Extended green belt provides a buffer for viewers.



Lakeshore Avenue Panorama

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18th Steet Panorama

18th Street Panorama

The historic pier is on axis with the Boathouse, builit in 1915 and now housing the Parks and Recreation offices. From this vantage point, the green lawn is a positive visual amenity. This historic building site is enhanced within the landscape setting. The building provides a strong architectural façade and sets the tone for the rest of the architecture within the Park. The view of the downtown skyline is striking. The banks need landscape improvements to the south and north of the pier. To the south of the pier is a view of the only angled bank where goslings can exit the lake (besides the boat ramp at the Sailboat house). The pier is in need of restoration. The balustrade details provide a solid architectural element that is enduring and important to maintain.

A. Balustrade details of 18th Street Pier provides historical time setting, pier in need of repair.

B. High-rise building provides housing density in relationship to ground area used. Guidelines for landscape trees or terraces could soften impact from ground view.

C. Existing palm tree creates striking look against skyline.

D. View of angled bank from 18th street pier provides one of the few places where goslings can exit the lake.

E. Boathouse is on direct axis view from 18th street pier, view provides park architectural setting.

F. View of 19th Street building skyline from 18th street pier.

G. Band from green lawn enhances view. Banks of soil need improvement

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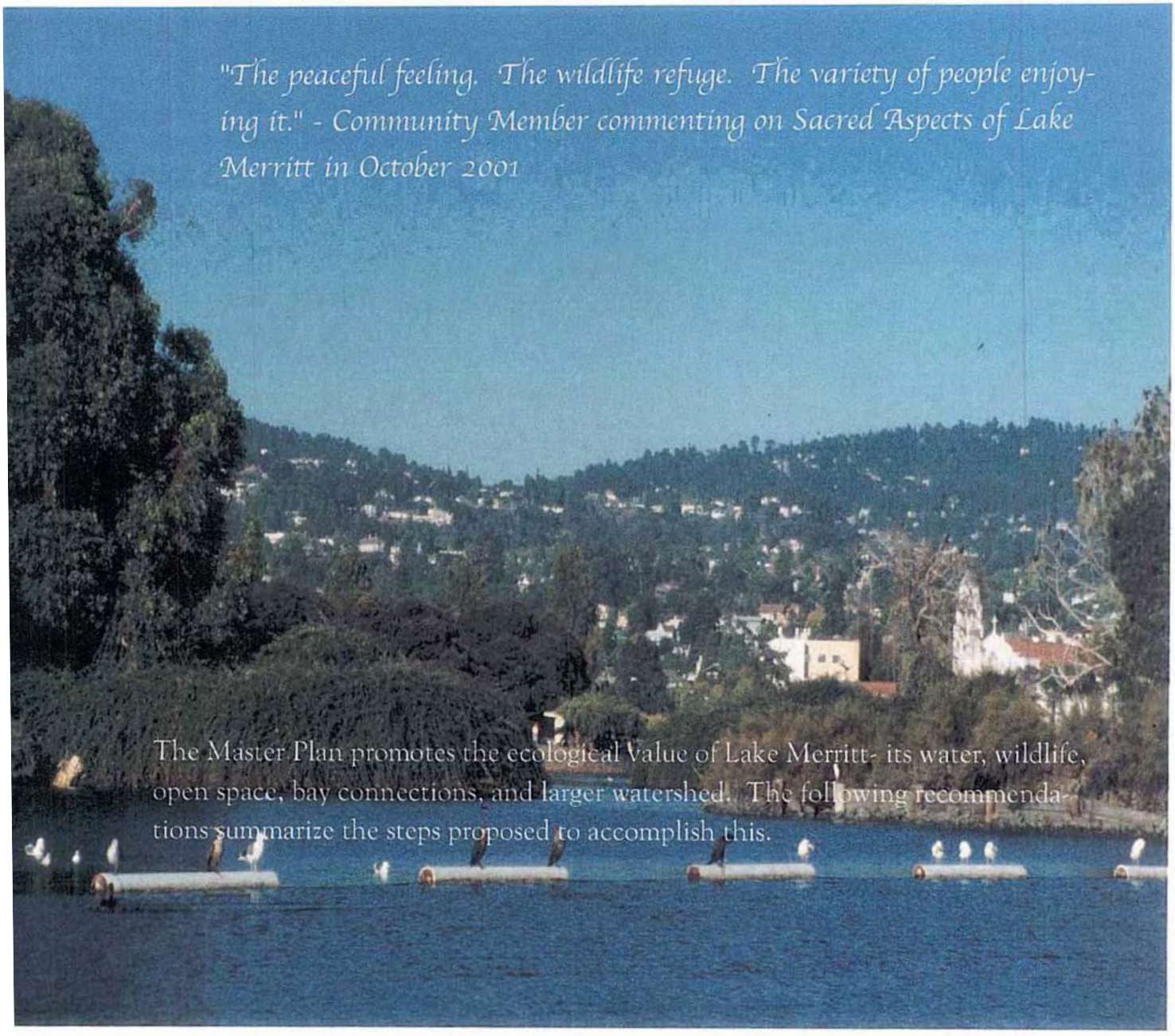
ECOLOGY



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Recommendations

Water Quality

1. Improve water quality by controlling pollution in the watershed. This should be accomplished by:

- A significant increase in enforcement of litter laws
- Continuous educational campaigns targeting businesses where litter is generated
- Educational and enforcement campaigns to eliminate waterfowl feeding
- See applicable activities on list of projects from water quality task force.

2. Control and remove trash that enters the Lake from storm drains and from the shoreline. This should be accomplished by:

- Installation of storm drain filters (CDS or other brand) five each year for 12 years
- Continuation of the Clean Lake Program to remove trash from the Lake.
- Building hook shaped "trash traps" into the shoreline at several locations when the bulkhead wall is replaced.

3. Improve water circulation in the bottom layer of the Lake by enhancing the connection to the estuary via the channel. This should be accomplished by:

- Forging an agreement with Alameda County to make tide gate closure decisions on a 12 hour basis.
- Removing the culvert condition at 12th Street and lowering the weir elevation to a point that maximizes water flow while minimizing disruption to recreational and scenic resources.
- Eliminating flow obstructions in the channel such as the culverts at 10th Street, the Flood Control Station (7th Street), the railway tracks and utility structures.
- Completion of a hydrology survey to recommend specific Lake water levels and alternatives for achieving these.
- Relocating the Alameda County pump facility to a location closer to the Lake and drawing water from the bottom of the Lake.

4. Provide for long term control of sediment, seaweed and plankton. This should be accomplished by:

- Continuation of algae and widgeon grass harvesting with establishment of several sanctuary areas
- Obtaining a small, city owned dredge boat (run by the harvester operator) to reduce the area of widgeon grass infestation and remove sediment around storm drains and docks
- Based on monitoring data, targets for reduction of nitrogen entering the Lake from creeks and storm drains should be established.

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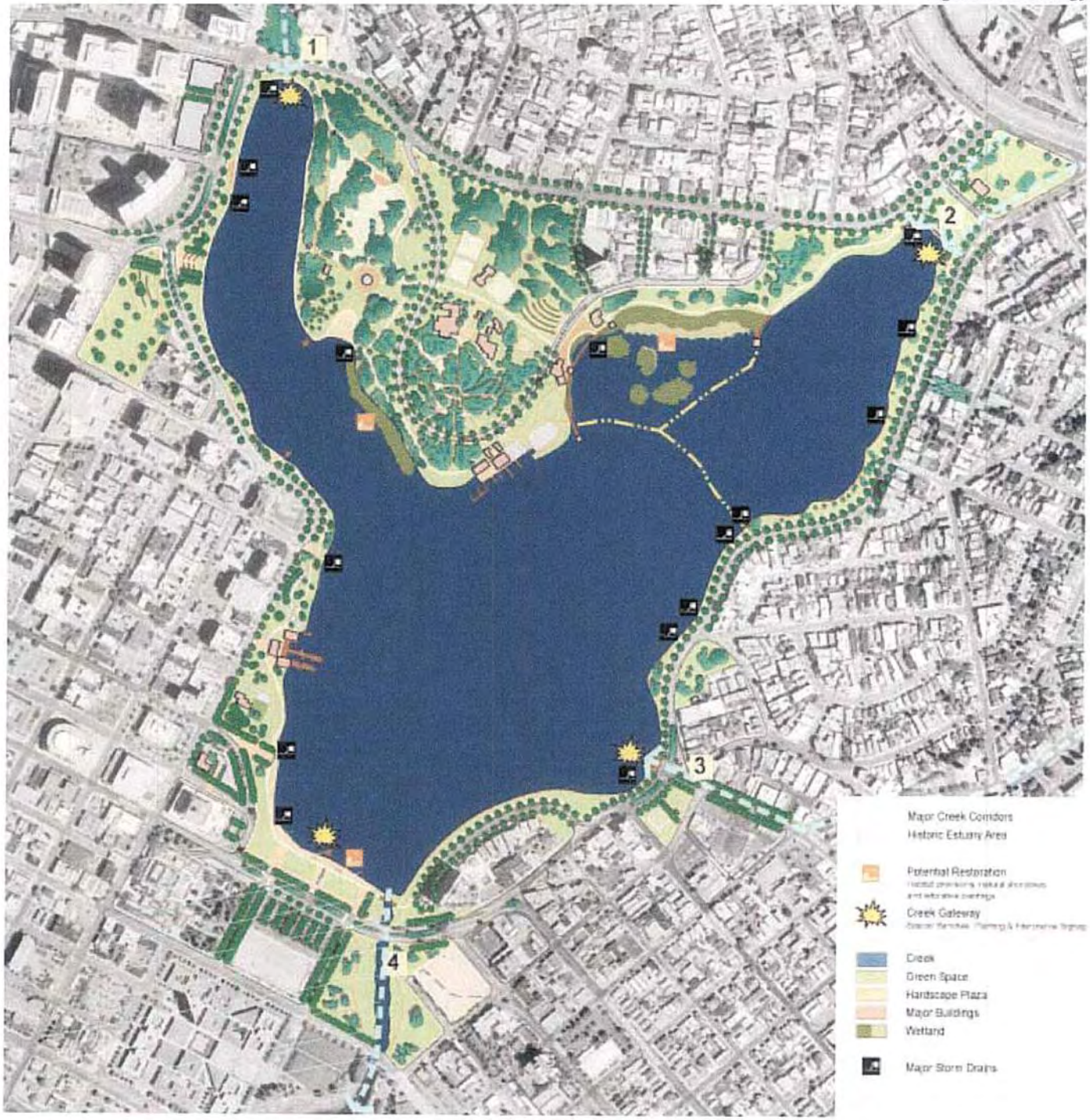
ECOLOGY

Figure III.26 Ecology



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Wildlife

1. Enhance specific areas for wildlife, including creation of a ecological zone in Lakeside Park (Shoreline Zone). This should be accomplished by:

- Moving the path away from the shoreline in key locations, creating a more natural (slight gradient) shoreline, relocating inconsistent uses such as parking lots, active playgrounds, and operations that are not waterfront dependent.
- Calming motor and pedestrian traffic near the duck pond by expanding walkways, and separating users
- Creation of a paved fresh water pond at the mouth of outfall # 1 by the Bandstand beach
- Creation of a wetland area by removing the center of one of the islands, depositing it around the shoreline, and creating a fresh water pond within the island
- Implementation of a habitat improvement plan on the islands
- Providing perches for birds on the water side of the perimeter bulkhead walls

2. Restore a managed, youth fishing program, beneficial to those from all areas of Oakland. This should be accomplished by:

- Accepting offers from the state Department of Fish and Game to stock steelhead trout and conduct "Fishing in the City" programs.
- Establishment of rules including "no fishing" zones in natural areas or where conflicts with other park users may occur
- Requiring completion of an educational program prior to obtaining a mandatory city fishing permit

3. Establishment of a policy that the wildlife refuge should be managed primarily for migratory waterfowl. This should be accomplished by:

- An educational campaign to eliminate public feeding of birds
- Management to reduce overwhelming concentrations of pigeons, resident geese, and similarly domesticated fauna

1 Glen Echo Creek

2 Pleasant Valley Creek / Trestle Glen Creek

3 E. 18th Street and Dock

4 12th Street / San Antonio Creek

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ECOLOGY

Goose Management

The unique balance between wildlife and human users at Lake Merritt is threatened by the large populations of geese. Both recreationalists and geese utilize the lawn areas of the park. The presence of fecal material from such high numbers renders the areas unusable for human recreation. Walkways, docks, bowling greens, and tables are also covered in goose excrement. This is especially problematic in areas where children congregate and during molting season (June to August). Geese feed on the mown lawns and are attracted by the visual openness. The geese typically congregate nearer the shoreline, however it is not uncommon to find them along Grand Avenue or in Snow Park.

The LMMP recognizes the need to review potential wildlife management practices to ensure that the notion of refuge is afforded to all. During the outreach process, many voices in the public expressed that geese are negatively impacting the park. As a significant ecological resource, Lake Merritt management should be sensitive to habitat provisions for wildlife. Practices should emphasize native avian species (shorebirds, migratory waterfowl) and fisheries. By implementing a range of techniques, domesticated wildlife such as geese should be brought into balance with other species and park uses.

Background Information ("Managing Canada Geese in Urban Environments")

- Canada gee se have undergone a significant population increase from a few thousand in 1965 to 1.1 million in 1996 in the central United States alone.
- Lake Merritt is not a historic site for large goose poulations. In the 1940's several crippled birds were released. Their numbers grew to about 75 in 1994. By 2001, a total of 1,093 birds were noted before fall migration. After migration, about 400 resident geese remained.
- Heavy concentrations of goose feces contain nitrogen which can lead to excessive algae growth in Lakes.
- High concentrations of geese increase the likelihood of avian disease to be transmitted between geese and other waterfowl.
- Migratory patterns have been researched and coordinated with habitat protection.
- Geese at LM molt in summer early June to late July-they are flightless during this time and concentrate along the shoreline. Numbers at the lake increase dramatically during this period causing increased conflicts with the park's most popular summertime use by humans.
- Geese prefer fertilized lawns to unfertilized ones and graze on the young grass shoots.
- Goose management programs to reduce the size of local flocks have been initiated at numerous sites in the Bay Area.

"Need to separate feeding and bird congregation areas from public paths where everybody walks." -Community Member commenting on geese at Lake Merritt in October 2001.

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Lake Merritt Site Conditions

- Studies have shown that geese excrete 10,000,000 fecal coliform bacteria per day. A total coliform count of 170,000 (unit unknown) was recorded near the bird islands in April, 2000.
- Open grass lawns near lake edge are populated with geese.
- Gatherings of 2-200+ geese are common.
- Fecal material covers all lawn areas inhabited by geese.
- Playground near Rotary nature Center has extensive fecal material.
- Accumulation of feathers is visible in the shallow water.
- Visitors feed and greatly enjoy the presence of geese.
- Nesting areas on the lake's shore are few- Geese are opportunists and will find small, protected spots in man made structures or high use areas. Natural lake edges like bluff segments in Lakeside may be used. Most successful nesting occurs on the refuge islands.
- Goslings appear on lake with adults during April.

Goose Habitat Conditions in Park

- Geese prefer open grassy areas where they feed on new grass growth.
- They tend to prefer park areas that are near or in sight of the lake.
- Geese require fresh water and congregate in areas of wet grass where available.
- Geese avoid areas frequented by dogs.

Goose Management Recommendations

Limit goose access in areas extensively used by people. This should be accomplished by:

- Initiating a Goose Management Study to determine the best practice techniques for reducing the impacts of geese on themselves, vegetation, other wildlife, and recreational users. This may involve commencement of a trial use of commercial Goose-Buster service to prevent geese from congregating in designated recreation areas during the summer.
- Creating a zone within Lakeside Park (Free and Open Space Zone) that emphasizes unimpeded use of lawn areas for informal recreation without disruption by goose fecal material.
- Eliminate the feeding of geese by park visitors.
- Reduction of grass and replacement with vegetative cover to that prevents grazing by geese in designated areas; increasing mowing height elsewhere.
- Establishment of vegetative visual and flight barriers to discourage geese from congregating in designated areas.
- Allowing on-sidewalk leashed dog walking per city park code.

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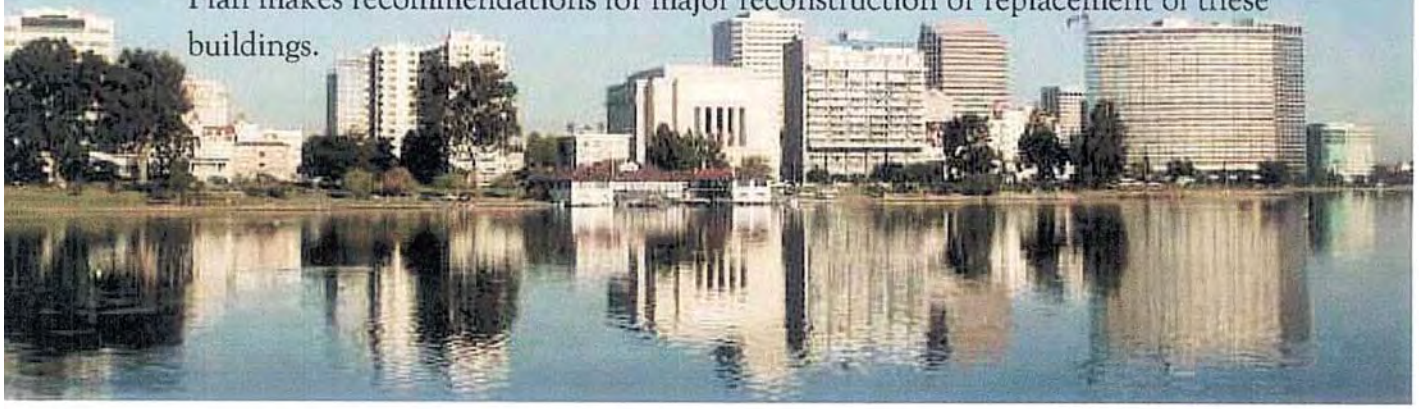
BUILDINGS

General Architectural Background

The buildings of Lake Merritt have evolved over a ninety year span, from the Municipal Boat House (originally constructed as the high-pressure salt water pumping station), to the recent Police Horse Stables. Understandably, there is a wide variety of styles, materials, scales, methods of construction, etc. in the architecture.

The buildings included in this study can be divided generally into two categories based on era of construction. The first era includes buildings constructed between 1909 and 1926: specifically, the Municipal Boat House, the Sailboat House, and the Lawn Bowling Clubhouse (and related outbuildings). The second era includes buildings originally constructed in the 1950's; the Rotary Nature Center, the Lakeside Park Garden Center, and the building which houses the Junior Center of Art and Science.

It should be noted that the Sailboat House and the Junior Center of Art and Science building have had major alterations during their history. in the case of the Sailboat House, the remodel has completley altered its appearance. The Master Plan makes recommendations for major reconstruction or replacement of these buildings.



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Extents of Study

The Lake Merritt Master Plan focuses on exterior form and appearance of existing buildings and makes suggestions for future construction. The eleven buildings included in this study are:

1. Municipal Boat House
2. Municipal Boat House Restrooms
3. Sailboat House
4. Sailboat House Restrooms
5. Sailboat House Storage
6. Lawn Bowling Clubhouse
7. Lakeside Park Garden Center
8. Rotary Nature Center
9. Junior Center of Art & Science
10. Police Horse Stables
11. Snack Bar

There are other significant buildings and structures in and around the Park which should be evaluated and be involved in any discussion of architectural character of the Park's structures. Specifically, these are:

12. Camron Stanford House
13. Glen Echo Pump House
14. Glen Echo Restrooms
15. Edoff Bandstand
16. Garden Center Restrooms
17. Corporation Yard
18. Gréenhouse and Lath house
19. McElroy Fountain
20. Geodesic Dome
21. El Embarcadero Landing Pergola
22. El Embarcadero Library
23. Library Restrooms
24. Pine Knoll Restrooms
25. Fire Alarm Building
26. Snow Park Restrooms

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BUILDINGS

Figure III.27 Buildings

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Architectural Goals and General Recommendations

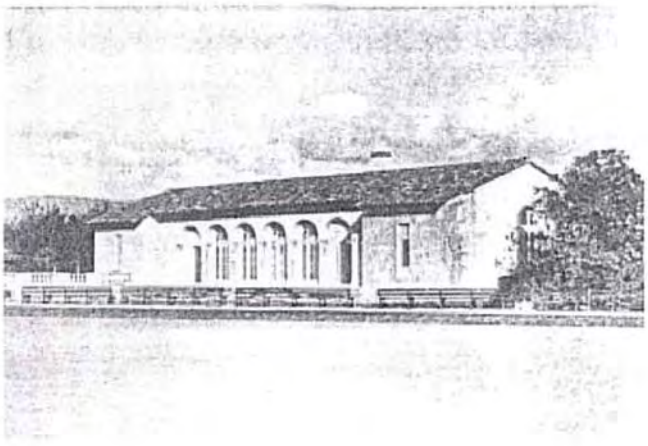
The Lake Merritt Master Plan makes four types of recommendations for the buildings included in the study.

1. Buildings to be revived/restored
2. Buildings to be rehabilitated/reconfigured
3. Buildings to be removed or relocated
4. New buildings

Buildings to be revived and restored include the Municipal Boathouse, and the Lawn Bowling Clubhouse. These are two of the defining buildings of Lake Merritt Park. They possess many inherent qualities which should be revived and encouraged. Restoration should be performed to the U.S. Secretary of the Interior's standards. Additions of poor quality should be removed or reconfigured in a manner which is sympathetic to the building's character, yet readily identifiable to avoid false historicism.

Buildings to be rehabilitated and reconfigured include the Sailboat House and the Lakeside Park Garden Center. While the Sailboat House will require major work to uncover the original character of the 1915 building, and integrate it with the site, the Lakeside Park Garden Center can be improved with a handful of discreet projects in key areas. The bulk of the building should remain intact.

Buildings which are intrusive, and detract from the Park should be removed or relocated. Two buildings which should be removed from the Park are the Police Horse Stables and the Snack Bar. A third, the building which houses the Junior Center of Art and Science (JCAS) should eventually, also be removed. A new building should be constructed to house the Junior Center of Art and Science, allowing the programs that this non-profit group offers to operate without interruption. This new building could also provide space to other educational programs and serve as a police sub station. In the interim, minor renovations to the existing JCAS building that improve its function and relate it to the park improvements are recommended



Letter
B17
attach.

BUILDINGS

General Building Recommendations

General architectural goals for new and existing buildings include:

1. To strengthen the relationship of the buildings to the landscape, using the buildings to help define outdoor spaces.
2. To strengthen the relationship between buildings by enhancing or introducing vistas, axes, etc.
3. To preserve key views and vistas around the Lake, and reinforce or establish view corridors where appropriate.
4. To enhance the sense of entry into the buildings.
5. To engage public interest with the buildings and invite interaction with the architecture, through introduction of courtyards, verandas etc.
6. To locate possible new buildings within the park, with the stipulation that there be no net increase to the overall ground coverage by buildings.
7. To provide a unified design theme for the two building types and new structures, this may take the form of materials, color palette, form, orientation, siting, etc.
8. To clearly identify building use through a unified signage program and where applicable, through use of materials, forms, and artistry.
9. To incorporate sustainable architecture, including use of recycled and environmentally friendly materials and methods.
10. To encourage passive systems for energy conservation wherever possible, and active systems, such as solar panels where not.
11. To provide accessibility to all buildings for people with disabilities.

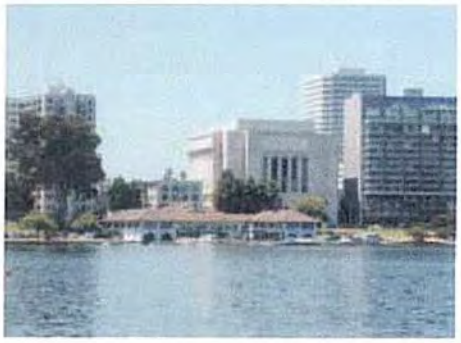
Letter
B17
attach.

Specific Recommendations for Future Buildings

1. Buildings should be of a civic scale, with monumental presence.
2. Architectural materials should be durable and solid, such as concrete or stone, to suggest permanence.
3. No new building should be more than two stories tall.
4. Accessory or secondary buildings should not overshadow or obscure primary park buildings.
5. New buildings should be sited on major circulation routes, as defined by the Master Plan.
6. Park buildings should be integrated into the landscape.

Opportunities for Future Study

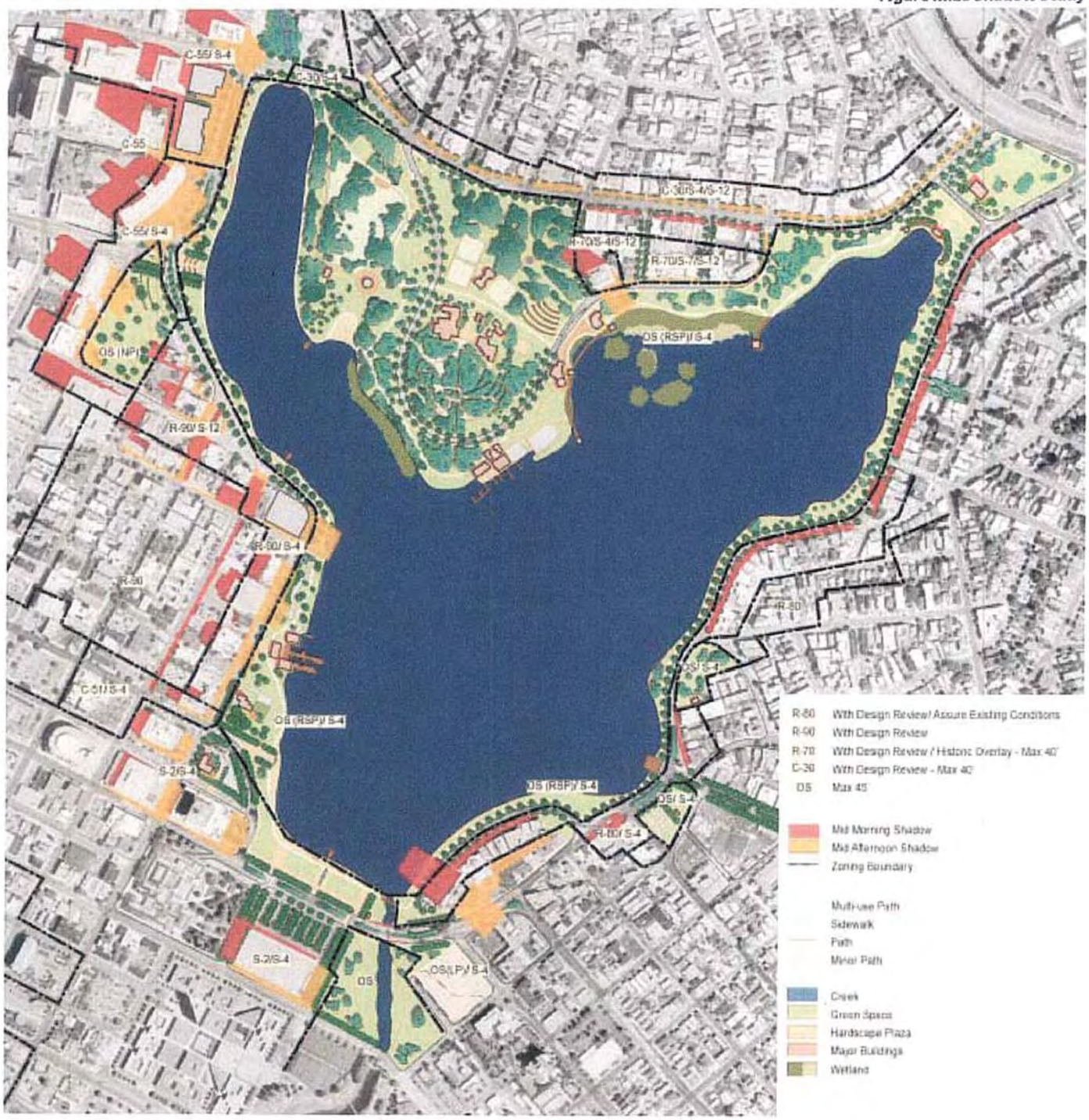
While the Master Plan does include façade improvement studies for existing buildings and thematic standards for future buildings, additional examination of the buildings should be performed as part of a complete study. This work might include seismic/structural, planning/use, mechanical/plumbing/electrical systems, hazardous materials, and accessibility compliance studies.



Letter
B17
attach.

SHADOW STUDY

Figure III.28 Shadow Study



Letter
B17
attach.

Sunlight Access and Shadow Study

Tall buildings are located on the perimeter of the Lake casting deep shadows into the parkland. This is problematic in that it reduces solar access for park users and disrupts the normal growing conditions for park vegetation. Furthermore, the imbalance of scale presented by these masses creates an uncomfortable sensory condition for those using the lawns, pathways, and benches nearby. This is further described in the Landscape section of this chapter though the use of panoramic photographs. The public has expressed concern for the negative impact of such structures, often characterizing the feeling as being "walled in." While the Master Plan presents no formal policy to non-park land use and massing, the effects are stated below. General recommendations are also stated to educate planners of future area buildings. No visual preference survey was completed during the planning process, however much public comment was received to substantiate this discussion.

Existing Conditions

- Buildings that cast continuous shade on the park (including Snow Park) for more than several hours each day negatively impacts vegetation growth.
- The blockage of afternoon/evening sunlight provides further negative impacts to park use and enjoyment.
- Groups of buildings form a continuous mass that can further block sunlight from reaching the park.
- Tall buildings (20+) floors standing alone are visually distracting when viewed from a distance (such as the several residential towers built around the Lake in the 1960's and 70's) .
- Four to twelve story residential buildings that have greater façade articulation and tall trees in the foreground generally provide a positive atmosphere. Examples of these are found on Lakeside near Snow Park and on Lakeshore Avenue.
- The view of tall buildings on the downtown edge are generally more scenic when viewed from across the lake as opposed to from the Downtown Park Edge due to the more comfortable scale relationship between people and buildings afforded at that distance.
- If heights were maximized per allowable zoning, the shade on park areas would be great (refer to figure III. on the facing page). Design review is required in most zoning areas of significant height.

General Recommendations

- New buildings should minimize interruption of sunlight into the Park.
- District zoning, design guidelines, and FAR regulations should consider building mass impact to park scale and sunlight access.
- Buildings should accommodate ample room for tall tree plantings in the foreground and along the street.
- The design review process required by most adjacent zoning should consider sunlight access and building mass impacts to the park and its users.
- The placement of new buildings should consider views to popular landmarks from the Lake Merritt park areas. These could include the County Courthouse, the Kaiser Convention Center, the Oakland Hills, St. Paul's Church, the Tribune Building, and others of visual importance.

Letter
B17
attach.

ART ELEMENT

The Lake Merritt Master Plan supports the City of Oakland's commitment to weaving arts and culture into the fabric of everyday life. Public art as an "element" of the park master plan maintains an openness of application. The art may include, singly produced objects, functional designs, a process of creation and collaboration, or an overall approach and design of a place. The art may be the product of individual artists' creativity or the result of collaboration between artists of different disciplines, designers, architects, and community members. The resulting condition can be a landscape of meaning and visual intrigue.

Through "Spotlight on the Arts", the Craft and Cultural Arts Department is seeking to establish Oakland as the center for artistic-cultural events and entertainment in the Bay Area. From downtown renaissance projects to the restoration of Lake Merritt, the opportunities to promote arts and culture are found throughout our city.

The LMMP recognizes opportunities for artists to reflect the unique environment, culture and social conditions of Oakland, its neighborhoods, history, natural resources, and people. The intent of the art element is to describe the many opportunities for integrating arts into the revitalization of the park. No specific projects are determined, nor is a single arts approach recommended. Rather, the master plan sets the thematic and programmatic content of the Lake Merritt Park art element. The plan then acts as a guide to shape the artistic exploration of concepts and projects as part of the art element. This chapter describes the opportunities and highlights the guidelines.

Letter
B17
attach.

Opportunities

Art Element Overview

Environmental Art

Natural conditions/processes should be recognized as a basis for site design and restoration. The landscape -more specifically, the art element-should integrate ecology as a function of the park and provide a means of its interpretation. Suitable locations for this type of expression could include the shoreline restoration in Lakeside Park; creek daylighting in Eastshore Park; other creek nodes, bird perches, storm drain filter covers, etc.

Designed Elements

Artists and craftspeople should be included to provide aesthetic input on functional elements in the park. Elements could include railings, fences, docks, botanical garden entries and perimeter fencing, neighborhood nodes (paving, seatwalls); historic markers and signage, entire promenades, low retaining walls, sections of the perimeter path, etc.

Collaborative Design Process

Many successfully designed and built projects are the result of collaborations between artists and designers. The process requires the partnership and collaboration of minds to conceive and execute such a work. Such an effort obscures the line between landscape and art, between meaning and aesthetic. Any improvement project is applicable to this process including zones or spaces within the park; entrances, nodes, and gateways; buildings recommended for restoration, remodeling or new construction; and park amenities.

Environment for Display

In addition to the incorporation of art as a design process, the lake and park offers a unique setting for the display of permanent and temporary sculptural work. The civic district of the park- stretching from 14th Street to the Estuary- is a potential area for sculpture display. Specific sites include the new 12th Street park area, the Fire Alarm Building Site, and the plaza at the 14th Street terminus. The Oakland Museum is recognized as a potential partner in the sculpture component and arts zone overlay.

Letter
B17
attach.

ART ELEMENT

Ecology

The art element should reinforce the park's ecological heritage and potential. By highlighting the creeks, watershed, habitat zones, and natural systems, the story of ecology can be made evident.

Education

An understanding of natural processes, horticultural diversity, cultural heritage, and the history of Lake Merritt can be reinforced through the application of the art element. The plan describes several methods for application under Opportunities.

Recreation

The park is used by many as a place for recreation. Provisions for these movements could be explored through the art element. For example, park amenities such as benches, signs, or walls, could combine exercise functions into their design; pathways could mark the pace or distance traveled of a jogger. The components could be artistically designed to serve a multipurpose role in the park.

Culture

Culture is an underlying theme to all aspects of the master plan. Oakland's urban form, social composition, ecology, history, and present activities each shape the notion of local culture. The art element can reflect the unique character of Oakland, its peoples, neighborhoods, built form, history, and natural environment.

Letter
B17
attach.

Art Element Recommendations

- The art element should be compatible with and enhance ecology/resource sensitivity.
- The art element should enhance the historic, cultural, aesthetic, and interpretive potential of the park and support the park program and management per the master plan and the department of Parks and Recreation.
- The art element should conform to applicable design guidelines for functional park elements, while enhancing the aesthetic and educational possibilities of these necessary amenities.
- The art element should consider maintenance requirements and minimize the need for specialized practices.

LETTER B17
John Wilson
September 11, 2007

Response B17-1: The Lake Merritt Master Plan was considered in developing the proposed project design and is described on page 94 of the Draft EIR. A section of the plan is attached to the comment letter. The Measure DD-funded activities would address many of the goals identified in the Master Plan, including the forestry, water quality, and architectural recommendations included in the section submitted with the comment. Chapter V, Alternatives, of the Draft EIR describes a "lid park" alternative for the 12th Street roadway construction, which was evaluated as part of the Lake Merritt Master Plan. As stated on page 348 of the Draft EIR, this alternative was identified as undesirable by community members and the design team due to several factors including: no direct estuary pedestrian connections were possible; tidal flow was not improved from the current conditions; the structure would not enhance shoreline access; and the cost to build the structure was not justified by the benefits. As such, this alternative was not evaluated in the Draft EIR.

Letter
B18

From: notify@yahoogroups.com on behalf of eliseackerman
[eliseackerman@yahoo.com]
Sent: Tuesday, September 11, 2007 3:05 PM
To: Thornton, Elois
Subject: EIR for Measure DD

Hi there,

Please take a look at the intersection of Harrison Street, Bay Place and 27th Street. It is already an extremely dangerous intersection with an accident or a close call happening about once a week. The Whole Foods that will open at the end of the month will exacerbate the problem. **1**

One block up the road, where Orange merges into Harrison, is also extremely dangerous. Motorists are confused by the configuration of the islands and drive down the wrong side of the street several times a day. **2**

Elise Ackerman
306 Oakland Avenue

LETTER B18
Elise Ackerman
September 11, 2007

Response B18-1: The 27th Street/Bay Place/Harrison Street intersection was evaluated in Section IV.C, Transportation Circulation and Parking of the Draft EIR. The text on page 115 of the Draft EIR notes that under existing conditions this intersection operates at LOS F during the AM peak hour. The text on page 124 of the Draft EIR (Impact TRANS-4) notes that implementation of the Lake Merritt and Lake Merritt Channel project components would result in significant impacts at this intersection, under the existing plus project conditions. The average vehicle delay at the 27th Street/Bay Place/Harrison Street intersection would increase by 4.6 seconds during the AM peak hour. Mitigation Measure TRANS-4 in the Draft EIR recommends optimizing the signal timing at this intersection to reduce the total intersection average vehicle delay by 49.9 seconds during the AM peak hour. Although with mitigation the intersection would remain at LOS F, it would operate at a total average vehicle delay that would be 45.3 seconds lower than the delay with no project and no mitigation. The increased delay and decreased LOS would not increase the hazard at the intersection – reduced traffic speeds would lower the safety risk at the intersection. It is also noted in the Draft EIR that under cumulative conditions, the proposed project would have a less-than-significant impact on this intersection (see page 134).

Response B18-2: The intersection identified in the comment is not part of the project area.

Letter
B19

From: Barton Mayhew [bmayhew03@yahoo.com]
Sent: Tuesday, September 11, 2007 1:38 PM
To: Thornton, Elois
Cc: harrioak@yahoogroups.com; rbishop747@aol.com
Subject: Measure DD draft EIR Comments

Ms. Thornton: I am responding to the "Measure DD draft EIR" affecting the intersections and crosswalks around, nearby, and/or adjacent to Harrison Street, Bay Place, and 27th Street. Due consideration needs to be included regarding pedestrians and cyclists, and vehicle traffic configurations on and near these public streets, and walkways. Safety for pedestrians and cyclists especially needs to be emphasized first and foremost. Any changes in design, construction, or installation of controls should benefit people on foot or bicycle over and above vehicle movement. In other words, pedestrians and cyclists should be the primary concern for environmental impact alterations. Restrictions on vehicles, and provision for pedestrians and cyclists is mandated by state and local laws. Please apply highest standards for residents and visitors to this area of Oakland. **1**

Barton Mayhew, on behalf of traffic safety committees, Harrioak Neighborhood Association, and Westlake Community Coalition

LETTER B19
Barton Mayhew
September 11, 2007

Response B19-1: The design of the 27th Street/Bay Place/Harrison Street intersection is not part of the proposed project. Impacts to the intersection resulting from implementation of the proposed project are discussed in Section IV.C, Transportation Circulation and Parking of the Draft EIR. See response to comment B18-1 for the identification of level of service operation at the 27th Street/Bay Place/Harrison Street intersection.

As stated on page 139 of the Draft EIR, the Lake Merritt and Lake Merritt Channel group would not conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation. The project is consistent with the adopted Oakland Bicycle Master Plan (see Figure IV.C-5 of the Draft EIR for the most recent update) and Pedestrian Master Plan. It would improve bikeway connectivity and pedestrian access around Lake Merritt and along the Lake Merritt Channel and would complete linkages along the Oakland waterfront. No impacts to pedestrian or bicyclist safety were identified in the Draft EIR at the 27th Street/Bay Place/Harrison Street intersection under the City's significant criteria for the evaluation of environmental impacts.

Letter
B20

From: Catherine McBride [cmcbride@pacbell.net]
Sent: Tuesday, September 11, 2007 5:07 PM
To: Thornton, Elois
Subject: Fw: Measure DD EIR comments
Hi - don't know how these got dated 10-11 at 3:54 but I sent them today, 9-11, at 3:54 in hopes of making the deadline. Sorry and thanks - Catherine McBride

1

----- Original Message -----
From: Catherine McBride
To: Eathornton@oaklandnet.com
Sent: Thursday, October 11, 2007 3:54 PM
Subject: Measure DD EIR comments

Re: Harrison Street/Bay Place/27th Street traffic and Whole Foods impact on Measure DD.

A traffic test on use of the Whole Foods (WFs) loading dock, attended by neighborhood residents, WFs management staff, truck company management, and city staff and planners proved that:

1) WFs semi-trucks (even larger trucks are planned for future use) block the Harrison Street sidewalk and pedestrian traffic when using the loading bay and turning in/out of WFs.

2) WFs semi-trucks extend onto Harrison Street by several inches when using the loading bay.

2

3) The Harrison Street sidewalk parallel to WFs is extremely narrow even when accessible to pedestrians.

4) WFs trucks entering/exiting the loading bay cause traffic back-ups which stop traffic on Harrison Street in both directions since traffic must be stopped on all of Harrison to allow for the difficult maneuvering of large trucks into/out of the loading bay. WFs semi-trucks will be using the loading bay during drive time peaks due to municipal delivery time restrictions.

5) The are thousands of seniors who live in St. Paul's Towers, in the 4 apartment buildings located near Broadway/27th, the Downtown Senior Center located in the Veteran's Memorial Building - and no changes have been made to traffic safety islands, timing of crosswalk lights, or any other "slow pedestrian" safety needs. Family use these same streets and crosswalks when using the Lake Merritt facilities.

3

In summary, the opening of Whole Foods at the end of this month; the increased development of residential condos on Broadway; the high population of senior citizens; the development of the new cathedral; the expansion and development of Kaiser medical services; and the possible and DREADED development of lakeside condos (NO, NO!) when considered with Measure DD changes make for massive traffic problems for the Harrison Street/Oakland Avenue corridor that been in no way addressed or resolved in an integrated manner.

4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20

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Sent: Tuesday, September 11, 2007 5:07 PM
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4

As an area resident and active member of the HarriOak Neighbor Group and the Westlake Area Traffic

Letter
B20
cont.

Coalition, I submit these comments. I do not speak for these groups but we have struggle with these issue over many years.

Thank you,

Catherine McBride
242 Frisbie Street
Oakland, CA
94611
510-465-6605
District Three

LETTER B20
Catherine McBride
September 11, 2007

Response B20-1: This introductory comment, which states the correct date of comment submission, is noted. The comments submitted were received in time and are considered in this Response to Comments Document.

Response B20-2: The comment provides an opinion of traffic hazards at the 27th Street/Bay Place/Harrison Street intersection associated with the Whole Foods project and is noted. Also see Response to Comment B18-1.

Response B20-3: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response B20-4: The comment, which pertains to the merits of the proposed project and not the environmental analysis of the Draft EIR, is noted.

Letter
B21

Inlandboatmen's Union of the Pacific
MARINE DIVISION -- INTERNATIONAL LONGSHORE & WAREHOUSE UNION
NATIONAL OFFICE • 1711 W. NICKERSON ST., STE D • SEATTLE, WA 98119 • (206) 284-6001 • FAX (206) 284-5043

San Francisco Regional Office 450 Harrison Street, San Francisco, CA 94105 415-896-1224
FAX: 415-896-1226

FAX COVER SHEET

6538

TO: Elois A Thornton FAX: 510-238-~~3944~~

Planner IV DATE: 9-5-07

City of Oakland - Comm + Econ Dev. Agency

FROM: **Marina V. Secchitano, Regional Director**

RE: Opposed to pedestrian walkway on Bridge faces

Number of pages including cover sheet: _____

Message: Our Captains are very concerned about the safety of this proposal.

Please see letter attached —

Marina V Secchitano

1

2

REGIONAL OFFICES

PUGET SOUND
W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5040
FAX (206) 284-5043

REGION 37
1711 W. Nickerson, Ste D
Seattle, WA 98119
(206) 284-5321
FAX (206) 284-5043

COLUMBIA RIVER
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Portland, OR 97209
(503) 226-6000
FAX (503) 223-2556

SAN FRANCISCO
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San Francisco, CA 94105
(415) 896-1224
FAX (415) 896-1226

HAWAII
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(808) 847-0611
FAX (808) 847-9051

SOUTHERN CALIFORNIA
1911 N. Gaffey, Ste. A+B
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FAX (310) 521-9094

KETCHIKAN
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Ketchikan, AK 99901
(907) 225-6360
FAX (907) 225-8656

JUNEAU
3017 Clinton Drive, Ste 201
Juneau, AK 99801
(907) 790-9544
FAX (907) 790-9545

Letter
B21
cont.

NORTHERN CALIFORNIA DISTRICT COUNCIL – ILWU

1188 FRANKLIN STREET • SAN FRANCISCO, CALIFORNIA 94109 • (415) 775-0533

AFFILIATED
ILWU LOCAL UNIONS:

Local 6 Warehousemen:
San Francisco
Stockton
Oakland
Redwood City San Jose
Crockett Richmond
Salinas

Local 10 Longshore
San Francisco

Local 14 Longshore
Eureka

Local 17 Warehouse
Broderick

Local 18 Longshore
West Sacramento

Local 34 Shipclerks
San Francisco

Local 54 Longshore
Stockton

Local 75 Watchmen
San Francisco

Local 91 Walking Bosses
San Francisco

IBU Marine Division
San Francisco

September 5, 2007

Attention: City of Oakland Planning Commission:

We have reviewed your Draft Environmental Impact Report and are very supportive of the overall intent of the project. A waterfront trail is a positive way for the community to access the waterfront and all its unique activities. **3**

Extending the Waterfront Trail around the bridge faces into navigable waterways would interfere with maritime activities. Both the Park Street Bridge and the High Street Bridge are narrow and congested with other vessel traffic, recreational boaters, etc. Currently, all the space available is needed to ensure that the commercial vessel maneuvers can be performed safely. We believe this portion of the plan is a conflict with Policy W2.6, as it unnecessarily endangers public safety, as well as interfering with maritime activities.

Some of our ILWU Captains have over 30 years experience on this route delivering sand and gravel to the Hanson Yard under all kinds of conditions and feel strongly that the implementation this part of the plan would jeopardize the safe transit of their tugs and barges through the bridges. **4**

Waterborne transit is an environmental friendly way to move products, and it reduces the amount of trucks necessary on the roadways. To replicate the volume of aggregate being delivered would result in thousands of truck transits a year added to the Bay Bridge and the community. The ILWU has been working in a partnership with the Oakland community to improve the air quality. While we support the Waterfront Trail, we ask that the City work to make sure that our navigational waterway is not impeded by the incursion of the pedestrian trail around the bridges.

In closing, we note that there are many good union jobs at stake. If it is necessary to close this facility we deliver to because we can't safely get through the bridges, this will result in the loss of many good union jobs with health care for our families and good pensions. **5**

Please redraft this part of the plan regarding the Waterfront Trail. **6**

Sincerely,

Marina V. Secchitano
Vice President

MVS/lk
cwa39521

LETTER B21
Inlandboatmen's Union of the Pacific
Marina V. Secchitano, Vice President
September 5, 2007

Response B21-1: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-2: The comment, which expresses concern with the safety of the proposed project, is noted. Refer to Response to Comment A8-1.

Response B21-3: The comment, which expresses support for the proposed project, is noted.

Response B21-4: Refer to Response to Comment A8-1.

Response B21-5: The comment, which pertains to the merits of the proposed project, is noted.

Response B21-6: Refer to Response to Comment A8-1.

Letter
B22

From: Bishop, Mike (Oakland) NA [Mike.Bishop@hanson.biz]
Sent: Monday, September 10, 2007 10:25 PM
To: Thornton, Elois
Subject: Measure DD Draft EIR
Please see attached comments to Measure DD Draft EIR.

Mike Bishop
Marine Operations Manager
Northern California
Hanson Aggregates
(510) 261-8573

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates
4501 Tidewater Avenue
Oakland CA 94601
Tel. 510 261-8533
Fax. 510 534-7418

September 10, 2007

Attention: City of Oakland Planning Commission

Subject: Draft EIR for Implementation of Measure DD projects – Oakland Waterfront Trail and Access Improvements

Lack of Public Out-reach:

- Hanson is in favor of the concept of creating public access to the waterfront and has been involved in the process over the last 3 years. That said the public out-reach for this EIR has been very limited, as a stakeholder and a participant we have had very little contact with the process over the last two years. The scope of the project was brought to our attention by the US Coast Guard and that was by the time the EIR project was well underway. There was no notification of the scoping meeting received for stakeholders. There was no invitation to comment or participate during the EIR process. This Draft EIR encompasses a huge scope and I do not believe the out reach to the public has been very encompassing to alert the public of the impacts of these projects. **1**

Group 2 Alternatives – Waterfront Trail Surface Street Connection Alternative (Group2)

- This alternative failed to mention that eliminating the boardwalks under the bridges, specifically the High St Bridge and the Park St Bridge would also reduce the impacts to navigation under these bridges. Reducing the navigational channel under these bridges may severely impact current and future barge traffic that currently use the estuary. This point was not address in this Draft EIR. **2**

Table II-1: Summary of Impacts and Mitigation Measures – A. Land Use (Group2)

- This Draft EIR does address the need for safe access along the waterfront on the Hanson Aggregates lease. What it has omitted is how complex this issue is. In preliminary meetings in 2004 several designs and discussions were considered as to how the Bay Trail may safely access the working waterfront site at Hanson. There was no conclusion drawn at that time and the one proposed in this Draft EIR is far from adequate. Discussed at that time was the overall poor condition of the concrete pier in which the path would be on as the path crossed the Hanson lease, the Draft EIR does not address this issue. It does not address the impacts the trail would have on the barge unloading operations at this location either. **3**

Letter
B22
cont.

Hanson
HEIDELBERGCEMENT Group

As stated Hanson Aggregates is in favor of the Bay Trail and conceptually routing it over property that is leased. These comments are to address the omissions in the Draft EIR in regards to the impacts on our environment, operations and business as they are today. 4

Regards,

Mike Bishop
Marine Operations Manger
Hanson Aggregates

LETTER B22
Hanson Aggregates
Mike Bishop, Marine Operations Manager
September 10, 2007

Response B22-1: Refer to Response to Comment B4-1 for a general description of the process that was used to notice the Draft EIR. In addition, Joel Peter, Program Manager for the Measure DD Project, e-mailed Mr. Hanson on August 10, 2007 to notify him of the availability of the Draft EIR.

Response B22-2: The comment correctly states that the proposed Waterfront Trail Alternative notes that eliminating the boardwalks under the bridges would also reduce the impacts to navigation under these bridges. While the City did not find the impedance of marine shipping to be a significant effect under the City's significance criteria (Refer to Response to Comment A8-1), the City recognizes that the U.S. Coast Guard and the marine shipping community oppose the undercrossings of the bridges on the Oakland Channel and that the U.S. Coast Guard might not be willing to issue a permit for the proposed undercrossings. The text on page 357 of the Draft EIR is revised as follows:

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree than the proposed project. All objectives for the Lake Merritt and Lake Merritt Channel, the Recreational Facilities, and the City-Wide Creeks Groups would be met. <u>It is being considered, in part, because the U.S. Coast Guard and the marine shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail and because the U.S. Coast Guard has permitting authority in this area.</u> The alternative would complete the missing segments of the San Francisco Bay Trail along the Oakland Estuary, albeit with segments that would not be constructed on the waterfront but rather on nearby streets. Because the trail would avoid contaminated properties, hazardous waste impacts associated with these properties would not occur but the properties would also not be remediated, one of the objectives of this project group. The alternative would support some of the objectives of OSCAR and the Estuary Policy Plan by completing a linear trail along the waterfront; however because the segments would be completed away from the shoreline in some cases, the alternative would not create as much physical and visual access to the Oakland shoreline as the proposed project.

Response B22-3: On page 57, the Draft EIR acknowledges that crossing the Hanson Aggregate facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time and the text on page 57 of the Draft EIR is revised as follows:

(14) Gallagher & Burk/Hanson Aggregate Trail Connection. The proposed segment of the trail adjacent to the Gallagher & Burk asphalt plant would be a concrete pier supported walkway. As the Hanson Aggregate facility uses water access for delivery of materials, the trail would be designed to allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail. Property easements are being sought for this segment of the trail, but operational constraints may preclude completing this segment of the trail while the facility is in operation. An interim route may include a connection to Tidewater Avenue, which is analyzed in the Section V, Alternatives.

Response B22-4 The comment, which pertains to the merits of the project, is noted.

Letter
B23

GALLAGHER & BURK INC.
PAVING GRADING
OAKLAND, CALIFORNIA

LETTER OF TRANSMITTAL

344 High Street Oakland, CA 94601
Tel. 925-829-1446 Fax 925-829-8174

TO: City of Oakland
Community & Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza
Suite 3315
Oakland, CA 94612

Attn.: Elois A. Thornton

DATE	JOB NO.
08/27/07	

RE: City of Oakland Measure DD

WE ARE SENDING YOU: ☒ Attached ☐ under separate cover via: _____ the following items;

☐ Quote ☐ Specifications ☐ Plans ☐ Insurance Requirements ☐ Samples
☐ Change Order ☐ Copy of Letter ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	08/22/07	1	Comments regarding the City of Oakland Measure DD
			Implementation Project, Environmental Impact Report

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO Bob McCarrick
File No. 58004 Pedestrian Trail

SIGNED: Vicki Duma

If enclosures are not as noted, kindly notify us at once.

Letter
B23
cont.

GALLAGHER & BURK, INC.
PAVING & GRADING CONTRACTORS LICENSE NO. 141140A
344 HIGH STREET • P.O. BOX 7227 • OAKLAND, CALIFORNIA 94601
(510) 261-0466 • FAX (510) 261-0478

August 22, 2007

Subject: City of Oakland Measure DD
Implementation Project
Environmental Impact Report
State Clearinghouse #2006122048
Public Review Draft
Prepared by LSA dated July, 2007

To Whom It May Concern:

Gallagher and Burk has been a major contractor and employer in the City of Oakland since 1946, with offices at 344 High Street. Our asphalt concrete plant, located at our Tidewater address serves the infrastructure maintenance needs of the greater Oakland area, including the Port of Oakland's maritime and airport facilities.

We have reviewed a copy of the above referenced document and have concerns about the logistics and safety aspects of combining public access with industrial activities. As traffic and air quality issues become an increasing concern, we expect to supply the raw materials to our asphalt plant by water access. Paragraph 14 "Gallagher & Burk/Hanson Aggregate Trail Connection" on page 57, describes the adjacent trail being installed as a concrete supported walkway. The intent is to "allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail."

1

It is unclear to us how safety and access will be controlled. It is likely that we will be burdened with extraordinary costs of equipment and operations due to the issues related to public access. We request that these issues be addressed, including controls of public access and reimbursement of additional costs that our facility will incur.

We look forward to your attention to these matters, which are of grave concern to the long-term operation of our facility. If you have any questions or need additional information, please contact me.

Very truly,

Alan French
General Manager
Gallagher & Burk Materials Division

cc: Bob McCarrick

LETTER B23
Gallagher & Burk Materials Division
Alan French, General Manager
August 22, 2007

Response B23-1: Economic impacts (either at the "macro" level of the City, or at the "micro" level of the individual private business) do not fall under the definition of environmental impacts in CEQA and therefore are not discussed in detail in the Draft EIR. The Draft EIR correctly focuses on the physical effects of the project, which include land use conflicts and safety. These effects are discussed on page 81 of the Draft EIR and mitigation is proposed that would reduce the effects of the project to less-than-significant levels. Nevertheless, on page 57, the Draft EIR acknowledges that crossing the Gallagher & Burk facility may not be feasible while it is operational and thus the Draft EIR includes the possibility that the trail would be diverted to City streets (i.e., Tidewater Avenue) until an easement can be obtained. The City acknowledges that there may be several reasons why crossing of the property is infeasible at this time. Refer to Responses to Comment A8-1, B22-2, and B22-3.

Letter
B24

From: JSASAY@up.com
Sent: Monday, September 10, 2007 3:32 PM
To: Thornton, Elois
Subject: Comments on Lake Merritt Channel Measure DD DEIR

I am attaching Union Pacific Railroad Company's letter with comments concerning the Draft Environmental Impact Report.

(See attached file: Lake Merritt DEIR Comment Letter.pdf)

****

Jeff S. Asay
Senior Counsel - Western Region
Union Pacific Railroad
10031 Foothills Blvd., Suite 200
Roseville, CA 95747
(916)-789-6217.

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If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the contents of this message is strictly prohibited by law. If you receive this message in error, please contact the sender immediately and delete the message and any attachments.

Letter
B24
cont.

UNION PACIFIC RAILROAD COMPANY

LAW DEPARTMENT
10031 Foothills Boulevard, Suite 200, Roseville California 95747-7101
(916) 789-6400 Facsimile (916) 789-6227

JEFF S. ASAY
Assistant General Solicitor
Direct Line: (916) 789-6217

September 10, 2007

Community and Economic Development Agency
Planning Division
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Attn: Elois A. Thornton, Planner IV
(email: eathornton@oaklandnet.com)

Re: **Measure DD Implementation Project**
Lake Merritt Channel Improvements
Draft Environmental Impact Report
Case No. ER 06-0017

Comments Concerning Draft EIR

Dear Planning Division:

Union Pacific Railroad Company submits the following comments with respect to the Draft Environmental Impact Report identified above dated July 20, 2007.

The DEIR identifies the project boundaries as extending to the Union Pacific Railroad Company right of way and main line on the south end of Lake Merritt Channel. It is not possible from the maps in the DEIR to determine if the boundary encroaches into UPRR's right of way at that location. UPRR strongly objects to any designation of project boundaries that includes our right of way and trackage at this location. UPRR requests that the FEIR state definitely that the project boundary does not encroach on UPRR right of way between the main line and I-880. 1

Letter
B24
cont.

UPRR's right of way at this location contains triple tracks for the main line south and east from central Oakland and the Port of Oakland. This main line handles numerous passenger and freight trains on a daily basis. UPRR must retain the entire width of the right of way at this location for main line trackage and train operation. No part may be released or sold for improvements to Lake Merritt Channel. **2**

Further, UPRR has entered into an agreement with Caltrans relating to the seismic retrofit of Interstate 880 at this location. Pursuant to this agreement, UPRR will construct a third main line track on the north side of its right of way, utilizing available width at this location. The addition of this new third main track will require construction of a new railroad bridge across Lake Merritt Channel matching the elevation of the existing railroad bridges. Therefore, no encroachment of the Lake Merritt Channel on the railroad right of way will be entertained or permitted at this location. **3**

Please revise the DEIR accordingly, noting that project boundaries must not encroach on UPRR right of way and must not extend south of the north right of way line of the UPRR. It should also be noted that further expansion of the Lake Merritt Project south of the railroad must take into account the fact that the location and elevation of the existing and planned railroad bridges. **4**

Please contact the undersigned if more information is needed.

Very truly yours,

Jeff S. Asay

/amm

LETTER B24
Union Pacific Railroad Company
Jeff Asay, Senior Counsel – Western Region
September 10, 2007

Response B24-1: Refer to Response to Comment A7-1.

Response B24-2: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided.

Response B24-3: The comment, which pertains to Union Pacific railroad's control of the railroad right-of-way at the south of end of the Lake Merritt Channel, is noted. As the comment does not pertain to the environmental analysis of the Draft EIR, no further comment is provided. Refer to Response to Comment A6-1.

Response B24-4: Refer to Response to Comment A7-1.

STEEFEL, LEVITT & WEISS
A Professional Corporation

Letter
B25

September 14, 2007

19869

VIA E-MAIL (*EAThornton@oaklandnet.com*)

Elois A. Thornton, Planner IV
Community and Economic Development Agency
Planning Division
250 Frank H. Ogawa Plaza, Ste. 3315
Oakland, CA 94612

Re: Union Pacific Railroad Company's Comments on
Draft EIR for Measure DD Implementation Project, SCH #2006122048

Dear Ms. Thornton:

We represent Union Pacific Railroad Company ("UP"). By this letter, UP augments its letter to you dated September 10, 2007 and further presents its comments on the Draft Environmental Impact Report ("Draft EIR") for the Measure DD Implementation Project (the "Project"). 1

The Project seeks to implement Measure DD, a municipal bond measure passed by Oakland voters in 2002 that authorizes the City of Oakland (the "City") to issue bonds that fund physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreational facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restorative activities. The Project is divided into four implementation groups located throughout the City: (1) Lake Merritt and Lake Merritt Channel Improvements (Group 1); (2) Oakland Waterfront Trail and Access Improvements (Group 2); (3) North and East Oakland Recreational Facilities (Group 3); and (4) City-wide Creeks, Restoration, Preservation and Acquisition (Group 4).

Located adjacent to or otherwise near the Project sites are UP's railroad yard, a railroad line and right-of-way in Oakland (the "UP Line") that roughly parallels the I-880 freeway. As a result of this close proximity, the development or improvements proposed by the Project are likely to impact the UP-Line and rail services. 2

By this letter, UP brings to the City's attention its concerns regarding traffic, safety, trespassing, vibration, and mechanical odor. Based on our comments below, UP respectfully requests that the City analyze these impacts associated with the Project's location near the UP Line and require appropriate mitigation measures to reduce those impacts.

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

1. Background on UP

Many people know about UP's distinguished history. UP played a prominent role in the development of the first transcontinental railroad in the late 1860's. What many people do not know is that today, UP remains a significant owner of railroad property and a major freight transporter in the western two-thirds of the United States. In fact, UP is the largest railroad company in North America.

Of particular relevance to the Project, UP owns a railroad yard, railroad line and right-of-way immediately adjacent to or near the Project sites. UP operates freight services, and Amtrak operates passenger services, on the UP line. The UP line experiences a very high volume of rail traffic, as it serves the entire metropolitan Bay Area and is a major transportation corridor through Northern California. **3**

Given UP's significant presence in and around the City of Oakland, UP takes great interest in the City's growth and improvement. It is with this perspective that UP respectfully submits the comments in this letter.

2. Traffic

Many of the concerns specific to the Project, including, but not limited to, a concern about traffic, arise from the associated increase in population within the close proximity of the UP Main Line. Specifically, the Project proposes, in connection with Group 3, the construction of an East Oakland Sports Complex at the corner of Ednes and Jones Avenues. This component of the project proposes a 150,000 square foot addition to and expansion of the existing Ira Jinkins Park/Recreation Center (the "Center"). (Draft EIR, p. 57.) The facility is anticipated to include a 25-meter pool, activity pool, gymnasium, fitness center, meeting rooms and community space, and bowling alley.

The UP Line crosses several roadways at-grade to the immediate east of the Center, including, but not limited to, the at-grade crossings at 85th Avenue and 98th Avenue. A natural consequence of the expansion of the Center will likely be an increase in the number of people going there to enjoy the new recreational benefits. In turn, there will also likely be an increase in traffic volumes in and around that area, including the existing at-grade rail crossings. Traffic spillover effects may further increase vehicle trips over the at-grade crossings, as motorists attempt to take short cuts to avoid congestion along primary traffic aterials. Additional vehicle trips and traffic congestion could negatively impact at-grade rail crossings in the area by increasing the chance of train-vehicular conflicts, thereby raising an obvious safety issue. **4**

UP therefore urges the City to further analyze the Project's potential impacts on traffic inasmuch as they relate to rail safety and operations along the length of the right-of-way, and traffic flow at at-grade rail crossings near the proposed East Oakland Sports Complex, including, without limitation, those at 85th Avenue and 98th Avenue. UP's operations must not be affected

Letter
B25
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STEEFEL, LEVITT & WEISS

by greater traffic and potential congestion at at-grade crossings and, thus, adequate mitigation measures should be implemented. Possible mitigation measures include construction at the developer's expense of grade-separated crossings or permanently blocked-off closures of existing at-grade crossings. (For a further discussion on the concern of at-grade crossings, see Section 3 below.)

4 cont.

3. Pedestrian and Bicycle Safety; Trespassing

The addition of this substantial increase in population near the UP Line creates concerns not only about traffic but also about pedestrian and bicycle safety. Planned uses near the UP Line include, without limitation, recreational facilities (*e.g.*, East Oakland Sports Complex, Municipal Boathouse), parks, pedestrian and bicycle trails (*e.g.*, Waterfront Trail along the Oakland Estuary between Jack London Square and 66th Avenue), marina uses, residential, open space, roadways, and retail/commercial. Although this area is already populated, these developments and improvements will likely attract a substantially large amount of people the immediate vicinity of the UP Line, thereby raising concerns about pedestrian and bicycle safety, and trespassing.

For instance, the Waterfront Trail will likely attract more pedestrians and cyclists to the area around the UP Line. UP generally disfavors the location of pedestrian trails and uses adjacent to its tracks and therefore any trails or pedestrian uses adjacent to or in close proximity of UP's tracks that are currently under consideration should be highly discouraged. The distance between the trail and the UP Line is anticipated to vary from one point to another. In some places, such as the vicinity of the mouth of the Channel, the trail would be located immediately adjacent to the UP line. Some of those people using the trail could walk across the UP Line to reach the trail at various points, and others might trespass onto the UP right-of-way itself. Similarly, the pedestrian, bicycle, and small boat improvements in connection with the Lake Merritt Channel Improvements likely will increase the number of people who may walk or bike across the UP Line, and/or walk, bike, or boat beneath railroad bridges that span the Lake Merritt Channel, at point close to the mouth of the Channel, and that parallel the automotive bridge on Fruitvale Avenue. These potential impacts raise concerns about pedestrian safety, trespassing and interference with rail operations.

5

The concern about safety is also exacerbated by the Project's proposal to increase the population near existing at-grade crossings, such as, among others, the intersection of Embarcadero and 5th Avenue, at 85th Avenue, and at 98th Avenue. Although the vehicular traffic analysis in the Draft EIR found the Project's traffic impacts on the intersection of Embarcadero and 5th Avenue to be less than significant, the Draft EIR contained no analysis regarding pedestrian and bicycle safety at that intersection, let alone the at-grade crossings at 85th Avenue and 98th Avenue, near the proposed expansion of the Center. Patrons of the Center may walk or jog through and around the surrounding neighborhood, meaning that some likely would walk across the UP Lines at the aforementioned at-grade crossings, or might trespass onto

6

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

the UP right-of-way itself. This increase in pedestrian activity near the UP Line could implicate pedestrian safety around the tracts. **6 cont.**

Another safety concern is the City's stated goal to provide trail access along the Lake Merritt Channel south of 7th Street, which would require the trail to cross the existing UP mainline rail tracks at-grade and/or require a new at-grade crossing along the channel. (DEIR, p. 129.) We note that, any such new at-grade crossings (or modifications to existing crossings) require the permission of the California Public Utilities Commission. Although the Draft EIR states that the "resolution of improving trail connectivity is not intended to be resolved in this study," UP advises in advance that it strongly objects to any proposed at-grade crossings because they have obvious safety implications and could negatively impact train operations. (*Id.*) **7**

The Restoration Along Sausal and Seminary Creeks (Group 4) also presents a possible safety concern. The creek restoration activities raise the issue of whether the public access improvements would attract any additional pedestrians or cyclists across or around the UP Line. If so, the Draft EIR should examine the possible safety impacts. **8**

The City should therefore closely analyze pedestrian and bicycle safety, and the likelihood of trespassing onto the UP right-of-way in order to set forth appropriate mitigation measures. As the Draft EIR recognizes, Policy W2.5 of the City's General Plan states: "[t]o create safe access to water pedestrian, bicycle, and automotive railroad crossings should be provided where feasible." Thus, appropriate mitigation measures are not only desirable in their own right, but are also crucial to the Project's consistency with the General Plan. Specifically, the City should consider requiring the developer to install grade-separated pedestrian and bicyclist crossings as well as require the developer to construct only grade-separated roadways across the UP Main Line. To this aim, UP appreciates the City's decision that the preferred plan for the continuation of the Bay Trail along the Oakland Estuary is for the trail to pass under the railroad bridges along Fruitvale and High Avenues. (Draft EIR, pp. 55, Appendix D at p. 3.) **9**

The City may also want to consider requiring the developer to eliminate the existing at-grade rail crossings by either constructing grade-separated crossings at those locations and/or eliminating the crossings altogether. Other possible mitigation measures that the City should consider include, but are not limited to, solid barriers along the full lengths of the right-of-way, (for example, walls, as opposed to fencing, to manage pedestrians and vehicles), relocating such land uses far away from the tracks where possible, setbacks and buffers, the installation of sound walls or other barrier fencing along the full lengths of the right-of-way, pedestrian gates, pavement markings, "no trespassing" signs, railroad safety education programs, and planning for safe transportation routes to schools, entertainment, shopping, and recreational facilities. **10**

4. Vibration

As the Draft EIR recognizes, the Project sites are located adjacent to or near the existing UP Line, which generates airborne vibration. (Draft EIR, p. 175.) It is well-known, however, **11**

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

that UP's rail operations, as well as passenger trains, also generate ground vibration associated with an active railway. For instance, the Waterfront Trail and pedestrian, bicycle and small boat improvements likely will attract more people to the area immediately surrounding the UP Line, thereby exposing them to typical vibration that come with freight and passenger rail service. The Project is therefore anticipated to expose increased population to existing vibration, and the City should analyze this possible impact.

11 cont.

Possible mitigation measures include a condition of approval that requires the developer to disclose to the general public this pre-existing and predictably-occurring vibration, as well as construction and design techniques (*e.g.*, trenching and/or floating floors) that absorb and/or minimize interior vibration.

5. Mechanical Odor

Finally, it is also well-known that locomotives not only generate noise and vibration, but also may emit mechanical odors. Other existing land uses in and around the site include industry and commerce, and such land uses typically generate odors associated with their specific uses, thereby potentially resulting in cumulative impacts that some people in the area may notice. The various development and improvements proposed for the Project will attract more people to the area surrounding the UP Line and therefore expose them to existing mechanical odor. Although the Draft EIR briefly discusses odors from restaurants, manufacturing plants, agricultural operations, and industrial facilities, it does not mention the mechanical odors associated with locomotives. (Draft EIR, p. 155.) The City should therefore consider analyze this potential impact in the Draft EIR and implement any necessary mitigation measures.

12

***

UP appreciates this opportunity to comment on the Draft EIR for the Project and hopes that the City, as lead agency, gives due consideration to the above concerns. On UP's behalf, we would welcome the opportunity to sit down together with City officials and staff to discuss this Project as it progresses or any other project that may relate to UP's property or operations within the area. Such a discussion would afford UP and the City the opportunity to work in collaboration to ensure that the Project and all future development near UP lines are compatible with the rail services that will continue to serve the area for years to come.

Please give notice to UP of all future developments with respect to this Project and any other proposed transportation improvements in the vicinity as follows:

13

Mr. Terrel Anderson
Manager of Industry and Public Projects
Union Pacific Railroad Company
10031 Foothills Boulevard
Roseville, California 95747-7101

Letter
B25
cont.

STEEFEL, LEVITT & WEISS

With a copy to:

Andrew Bassak, Esq.
Shirley Jackson, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 30th Floor
San Francisco, California 94111.

13 cont.

Please do not hesitate to contact our office if you would like to schedule a meeting with UP or have any questions. UP will monitor this project with interest.

Sincerely,

Shirley E. Jackson

Shirley E. Jackson

cc: Andrew Bassak, Esq.
Mr. Terrel Anderson

19869:6608883.2

LETTER B25
Steefel, Levitt & Weiss
Shirley E. Jackson
September 14, 2007

Response B25-1: The comment letter was received on September 14, 2007, three days after the close of the comment period on September 11, 2007. Although the 45-day comment period for the Draft EIR had closed, the City has elected to respond to the comments provided in the letter.

Response B25-2: The comment, which describes elements of the proposed Measure DD Implementation Project and states that the project is likely to impact the Union Pacific Railroad (UPRR) lines and rail services, is noted. It requests that the EIR analyze traffic, safety, trespassing, vibration and mechanical odor issues associated with the proposed project's proximity to the rail line and require mitigation measures to reduce impacts. Refer to Response to Comment A7-1 and Responses to Comments B25-3 to B25-12 for responses to the specific issues raised for each topic.

Response B25-3: The comment, which describes certain aspects of the history of the Union Pacific Railroad (UPRR) and its presence in and around Oakland, is noted.

Response B25-4: The comment incorrectly states that the project would result in a substantial increase in population within close proximity of the UPRR Main Line. The project does not propose to build housing or other facilities that would substantially increase the residential population in the vicinity of the UPRR Main Line.

It is recognized that the East Oakland Sports Complex project would increase traffic volumes at the railroad crossings located at 98th Avenue and 85th Avenue. The study showed that peak hour traffic volumes on 98th Avenue would increase by less than two percent as a result of the project. The traffic added would not perceptibly affect traffic service levels at the rail crossing. The study did not evaluate traffic volume changes at 85th Avenue because the traffic volumes are relatively light and changes in traffic volume resulting from the Sports Complex were expected to have a less than significant impact on traffic operations along 85th Avenue.

The effectiveness of existing safety measures in place at all railroad crossings leading to the Sports Complex would not be significantly affected by the minimal changes in traffic volumes associated with the project. The small changes in traffic volumes would not justify construction of grade-separated crossings. Permanent blocked-off closures of existing at-grade crossings would transfer traffic volumes to other streets and could result in secondary traffic impacts.

Response B25-5: Please see Response to Comment B25-4 regarding population effects of the proposed project. In addition, project facilities, with the exception of portions of the Waterfront Trail and the trail along the Lake Merritt Channel, are located well away from (a quarter mile or more) the UPRR lines as shown in the figures provided in the Project Description and would not bring substantial numbers of people to the rail crossings.

It is recognized that there is a potential for pedestrians and bicyclists to travel between project elements (such as the Waterfront Trail and Lake Merritt) along 5th Avenue, Oak Street, or other streets near Embarcadero. The Draft EIR did not specifically address pedestrian impacts at railroad crossings because there are existing safety measures (i.e., crossing gates, warning lights, and chain link fencing along the Embarcadero) that would limit the ability of pedestrians and bicyclists traveling between the project elements to cross the tracks. The numbers of pedestrians or cyclists crossing the tracks to travel between project areas would not compromise the existing safety features at the crossings or exceed the capacity or capabilities of the existing controls to limit crossings of the rail lines.

The Waterfront Trail, which runs parallel to the UPRR lines, is separated from the tracks by roads, such as the Embarcadero and Interstate-880, and fencing. This infrastructure provides barriers between recreational users of the trail and the UPRR lines at non-street crossing locations. The trail along the Lake Merritt Channel currently ends just south of the 7th Street Bridge and this would not change as part of the project. No new at-grade crossings of the UPRR line are proposed as part of the project although existing crossings at 5th Avenue and Oak Street would be used by bicyclists and pedestrians, as they are now, to travel between the waterfront and other areas of Oakland. Refer to Response to Comment A7-1 for additional discussion of the rail line crossings.

The text on page 130 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (Pedestrian and Bicycle Transportation) (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing safety features would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

The text on page 139 of the Draft EIR is revised; the following text is added to the discussion of Alternative Transportation (as a new paragraph):

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control

access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing facilities would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

Response B25-6: Please see Response to Comment B25-4 regarding population effects of the proposed project.

It is recognized that the project may increase pedestrian and bicycle activity along 5th Avenue, 85th Avenue and 98th Avenue; however, the increase is expected to be small and would be consistent with City of Oakland's policy to encourage pedestrian and bicycle travel along these routes. For the Draft EIR, a review was performed of the potential of the project to conflict with adopted policies, plans and programs supporting pedestrian and bicycle transportation and was found to be consistent with City policy. The Oakland Bicycle Master Plan proposes bike lanes along 5th Avenue and proposes designation of 85th Avenue and Edes Avenue as Class III bike routes. Similarly, the Oakland Pedestrian Plan identifies 5th Avenue and 85th Avenue as neighborhood pedestrian routes, 98th Avenue as a City pedestrian route, and Edes Avenue as a District pedestrian route.

The increase in pedestrian activity near the UPRR Line would not be of sufficient magnitude to significantly affect safety around the tracks and would not justify construction of grade separated crossings. Walking, jogging, or bicycling across the UPRR lines at the aforementioned at-grade crossings would be consistent with City policies, plans and programs. The potential for trespassing onto the UPRR right-of-way would not be substantially affected by the project.

Response B25-7: The comment, which states that the UPRR would strongly oppose an at-grade crossing of the UPRR tracks in the vicinity of the Lake Merritt Channel and that new crossings or modifications of existing crossing would require permission of the California Public Utilities Commission, is noted. Refer also to Response to Comment A7-1.

Response B25-8: The locations of proposed creek restoration, preservation and acquisitions sites are shown on Figure I-3 and described in Table III-2. None of the project locations along Sausal and Seminary creeks as cited in the comment are in close proximity to UPRR lines. The nearest activity associated with Sausal Creek is a daylighting of the creek at Hawthorne School, which is located about 0.5 miles from the railroad lines. The nearest activity on Seminary Creek site, which is also located about 0.5 miles from the railroad lines, is the removal of a concrete channel and site restoration. Both sites are located in residential areas and there is considerable urban infrastructure between the restoration sites and the railroad, making traffic, pedestrian or bicyclist connections between the locations unlikely. Neither of the proposed activities would attract vehicles, pedestrians or bicyclists to the UPRR lines.

A creek restoration site along Lion Creek on San Leandro Boulevard near 66th Avenue is in closer proximity to the UPRR tracks than the creek locations cited in the comment. The restoration activity at this site would create wetlands along an existing section of creek within a residential project and an existing park. The UPRR tracks lie to the west of the park. The restoration is not expected to substantially increase park use and most users of the park would come from the residential areas to the east rather than from the industrial area to west. Thus, the creek restoration would not generate a significant number of vehicle, pedestrian, or bicycle crossings of the UPRR tracks.

Response B25-9: The entire text of General Plan Policy W2.5 that is cited in the comment reads, "**Improved Railroad Crossings.** To create safe access to the water pedestrian, bicycle, and automobile railroad crossings should be provided where feasible. Crossings could include grade separations, at-grade crossings, skyway bridges, or connections between buildings." The policy analysis in Appendix D of the Draft EIR correctly states that the policy is not applicable to the Lake Merritt and Lake Merritt Channel, Recreational Facilities, and City-wide Creeks Groups as no rail crossings are proposed as part of these groups; the under-crossing of the rail line proposed as part of the Waterfront Trail is consistent with the policy as well. It should be noted that the policy includes at-grade crossings as an option for safe access to the waterfront, where feasible. The comment, which states that the UPRR appreciates the decision to route the Waterfront Trail to pass under the railroad bridge at Fruitvale and High [sic] Avenues, is noted. Refer to Responses to Comments A8-1, B22-2 and B22-3.

Response B25-10: The comment, which suggests design features as mitigation for reducing safety hazards at rail crossings, is noted. As impacts to safety were found to be less-than-significant no mitigation is required. Refer to Response to Comment, B25-4 to B25-6.

Response B25-11: The impacts of ground-borne vibration are analyzed on p. 181 of the Draft EIR, which concludes that there would be no impact during the project's operational phase. The proposed Measure DD Implementation Project would not expose a substantial number of people to ground-borne vibration associated with the UPRR operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors into proximity with the UPRR lines. No new crossings of the UPRR lines are proposed as part of the project. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. The text on page 181 of the Draft EIR is revised as follows:

(4) Vibration. None of the four project groups contain components that would generate ground-borne vibration levels that would be perceptible to the average person. ~~There would be no impact during the project's operational phase.~~ The project may briefly bring people into proximity with transportation facilities along the Waterfront Trail, such as railroad tracks, that produce ground-borne vibration. But the project would not frequently expose a substantial number of people to ground-borne vibration. Construction activities associated with implementation of the project,

including proposed pile driving activities, could temporarily expose persons in the vicinity of the proposed project construction areas to ground-borne vibration or ground-borne noise levels. However, the project would comply with the construction hours specified in the City's Noise Ordinance and the City's standard Conditions of Approval would be applied. Implementation of the Conditions of Approval would ensure potential ground-borne vibration would be avoided or reduced to a less-than-significant level.

Response B25-12: The proposed Measure DD Implementation Project would not expose a substantial number of people to odors associated with the UPRR railroad operations. No sensitive uses (e.g., schools, hospitals, or housing) would be constructed as part of the project that would bring sensitive receptors in to proximity with the UPRR railroad lines. No new crossings of the UPRR lines are proposed as part of the project. The text on page 155 of the Draft EIR is revised as follows:

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

The text on page 159 of the Draft EIR is revised as follows:

(5) Objectionable Odors. The operation of the project components of Measure DD would not generate objectionable odors. Typically, major sources of odors include restaurants, manufacturing plants, and landfills. Other odor producers include industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects which are not expected to generate objectionable odors. The project may briefly bring people into proximity with industrial or transportation facilities that produce odors along the Waterfront Trail, but exposures would be brief and affect a relatively small number of people on an occasional basis. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. This potential impact would be less than significant.

Response B25-13: The comment, which states that the UPRR would welcome the opportunity to meet with the City to discuss its concerns, is noted.

C. VERBAL COMMENTS

The Planning Commission held a Public Hearing on September 5, 2007 to accept verbal comments on the Draft EIR from agencies, organization or interested individuals. The comments presented at the hearing are summarized and enumerated in attachment C1 and written responses follow.

Planning Commission Hearing
C1

COMMENTS AT THE OAKLAND CITY PLANNING COMMISSION PUBLIC HEARING FOR THE MEASURE DD IMPLEMENTATION PROJECT

September 5, 2007; City Council Chambers, City Hall, 1 Frank H. Ogawa Plaza

Public individuals spoke first, followed by Planning Commissioners.

Mike Bishop. Introduced himself as a representative of Hanson Aggregates at 4501 Tidewater Avenue in Oakland. Made the following comments:

- He has received little notice of scoping meetings for the project; he has been involved with the Bay Trail, working with City and Regional Parks. **1**
- Development of steel canopy noted in Table II-1 more complicated than described; site also has deteriorated dock that needs to be considered. **2**
- Narrowing of navigable channel under the bridges along the estuary makes it more difficult for barges to use the channel and might require switching to trucks to bring materials to Oakland. **3**
- Requested that the navigable channels be kept open. **4**

John Wilson. Made the following comments: **5**

- Many people who wanted to speak tonight had to leave earlier.
- Why are we 5 years into the Measure DD process and only now preparing an EIR? **6**
- The project has the appearance of poor planning and underfunding. There have been major design changes after the bond measure was passed. Why have projects changed? **7**
- Projects are stalled because they are overbudget.
- Government entities are only now being contacted. **8**
- Expressed concern about plan to remove trees; there is a mythology that only dead trees would be removed. **9**
- Found Figure III-1 helpful. Reason to remove trees was to create a view corridor. Asked where view corridor is and expressed concerned about tall buildings being constructed around lake **10**
- Lake is oldest designated wildlife sanctuary in nation. Boundary goes 1,065 feet from old tidal boundaries. **11**

Orna Sasson. Made the following comments:

- Voted on Measure DD to preserve parks.
- Old trees should be cared for by arborists.
- Parks are not the place for parking lots. **12**
- Need easements to preserve City parks.
- Let 1,000 parks bloom.

John Butcher. Introduced himself as the port captain for FOSS Maritime in Richmond. Made the following comments:

- Stated that he was here to discuss proposed walkway under bridges along the estuary. FOSS Maritime is a company of professional mariners that transports sand and other materials along waterways.
- The proposed walkways under bridges would reduce the openings by 25% under some conditions. Barges are 60-feet wide and the opening would be 90 feet when only one side of bridge is open. **13**
- Invited commissioners to see how channel would be constrained.

- A brief discussion occurred between Mr. Butcher, Commissioner Boxer, Joel Peter (Measure DD Program Manager), and Claudia Cappio (Community and Economic Development Agency, Development Director) ensued clarifying the proposed location and design of the walkway. Joel Peter indicated that the City believes that the walkway could be designed with adequate safety to protect users of the trail. **13 cont.**
- Mr. Butcher concluded by stating that he did not believe the walkway design is safe and that the Coast Guard agrees.

Nancy Rieser. Introduced herself as a member of Friends of the Lake. Made the following comments:

- Noted Friends of the Lake is sending written comments. **14**
- Stated that there is a lack of coordination with regional and state agencies with regards to the 12th Street Channel. **15**
- Stated the she has concerns about toxics in the bay fill in the project area that exceed state standards. **16**

David Mix. Made the following comments:

- Document is too extensive and not enough time at public hearing **17**
- Appendix C documents are too difficult to read, due to poor reproduction **18**
- He objects to entire document; it is based on improper or false material, junk science **19**
- Sewers and storm sewers have historically flowed into the lake and channel **20**
- Noted various studies that looked at flows through the channel. Some studies used MIKE II model and MIKE II didn't adequately consider elevations and size of culverts. **21**

Jonas LaMattery-Brownell. Introduced himself as a member of the Lake Merritt Neighbors Organized for Peace and a participant in the tree spirit photo by Jack Gescheidt. Made the following comments:

- Encourages the City to save as many trees as possible around Lake Merritt.
- The commentor read the following poem, which he had composed: **22**

The Merritt of Trees

Lake Merritt lakeshore's trees are alive,
As alive as you and me,
I run by them often and say,
Hey sticky sister, hey brother barkful,
Hello old one prickly, hello relatives rooted.
When I breathe, I breathe tree.
Just like sipping lake or sipping melted glacier stream,
Here in Oakland I breathe salty sunny air, a little pollution pepper and still too...
All the trees of Lake Merritt

Jacquee Castain. Made the following comments:

- Elmhurst District and East Oakland supports the East Oakland sports and swim center **23**
- Asked for City's help on cleaning up a nearby contaminated creek site on 85th Avenue. **24**

- Noted that according to the staff report and the EIR notice, comment period will end on September 10, which is a City holiday when offices will be closed. | 25
- The City of Oakland and the planning commission should allow more than 2 minutes per commentor to make verbal comments. The Planning Commission has reduced available meeting time over the past 4 years, which limits the number of people who can comment. | 26
- Measure DD funding was inadequate. | 27

Planning Commissioners

Michael Lichty. Made the following comments:

- Stated that many issues raised tonight didn't appear germane to the EIR and will be considered during engineering and design review. Claudia Cappio noted in response that impacts to navigable waterways are relevant to CEQA evaluation; document needs to identify impact to safety and navigation around bridge. | 28
- Need to resolve safety issue outside of the EIR process during the design work; hope issues will be taken seriously.

Paul Garrison. Made the following comments:

- Requested an update on the litigation about the proposed tree removals. Mark Wald provided an update. | 29

Suzie Lee. Made the following comments:

- Recommended commentors submit comments in writing;
- Expressed concern about impact to navigation and requested that impact be given serious consideration. | 30

Douglas Boxer/Michael Colbruno. Made the following comments:

- Commissioners stated that they would accept previous speaker's offer to take them out on a tug boat to observe the proposed sites of the trail walkways along the estuary. | 31

Madeleine Zayas-Mart. Made the following comments:

- Requested clarification of phasing and funding of project. Claudia Cappio noted that City is leveraging matching and supplemental funding from various sources. | 32

Oakland City Planning Commission Public Hearing Comments
September 5, 2007

Response C1-1: Refer to Responses to Comments B4-1 and B22-1 (comment letter B22 was submitted by the speaker).

Response C1-2: Refer to Response to Comment B22-3.

Response C1-3: Refer to Response to Comment B22-2.

Response C1-4: The comment, which requests that navigable channels be kept open, is noted. For additional discussion of this issue refer to responses to comment letters B8 (from the U.S. Coast Guard) and B22 (Mr. Bishop's written comments on the Draft EIR).

Response C1-5: The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-6: A history of the environmental review process for Measure DD-funded activities, which explains what has occurred between passage of Measure DD and the release of the Draft EIR, is provided in Chapter III, Project Description on pages 23 and 24 of the Draft EIR.

Response C1-7: The comment, which expresses concern about funding and planning for the Measure DD activities, is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no further response is provided.

Response C1-8: Refer to Response to Comment B4-1.

Response C1-9: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30.

Response C1-10: The reasons for the removing trees are varied; they are identified in Chapter III, Project Description on page 30. No tall buildings, which would block view corridors, are proposed as part of the project.

Response C1-11: The comment is noted. The Draft EIR notes the Lake's designation as a wildlife refuge on page 226.

Response C1-12: The comment does not address the environmental analysis of the Draft EIR so no further response is provided.

Response C1-13: The comment raises concerns about the impact of the Waterfront Trail on maritime shipping. Refer to responses to comment letters B8 and B22.

Response C1-14: The comments were submitted in writing. Refer to responses to comment letters B15 and B16.

Response C1-15: Refer to Response to Comment B4-1.

Response C1-16: Refer to Response to Comment B15-7.

Response C1-17: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-18: Full size copies of the original public comment letters that were received during the EIR scoping period have been and are available for review at: City of Oakland, Community and Economic Development Agency, Planning and Zoning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612.

Response C1-19: Mr. Mix submitted his comments in writing. Refer to response to his comment letter B11, in particular Responses to Comments B11-3 to B11-5, which are included under the heading "Junk Science" in the comment letter.

Response C1-20: The comment regarding the historic discharges to Lake Merritt is noted. The comment does not pertain to the environmental analysis of the Draft EIR so no additional response is provided.

Response C1-21: Refer to Response to Comment B11-3.

Response C1-22: The comment, which addresses the merits of the project, is noted.

fallen trees, sadness
spring tides flow strong again
park and lake reborn

Response C1-23: The comment, which addresses the merits of the project, is noted.

Response C1-24: The comment, which identifies a creek segment not included in the Measure DD Implementation Project, is noted.

Response C1-25: Due to the City holiday, the City accepted comments on the Draft EIR until September 11, 2007.

Response C1-26: The comment, which pertains to the amount of speaker time available at the public hearing, is noted.

Response C1-27: The comment, which states that Measure DD funding in inadequate, is noted.

Response C1-28: Refer to responses to comment letters B8 and B22.

Response C1-29: The requested information does not pertain to the environmental analysis of the Draft EIR. City legal counsel responded to the question at the public hearing.

Response C1-30: The statement regarding submittal of comments in writing is noted. Refer to responses to comment letters B8 and B22 for discussion of impacts to navigation and safety along the estuary.

Response C1-31: The comment, which does not pertain to the environmental analysis of the Draft EIR, is noted.

Response C1-32: Because of the large number of elements of the Measure DD Implementation Project, which are geographically dispersed across the City, a phasing plan for the entire project is not provided in the Draft EIR. Phasing and project status information for individual elements is provided where such information is available (see Table III-1 of the Project Description, for example). Individual projects would receive funding from a variety of federal, State and regional sources in addition to receiving Measure DD funds. The source of funding does not pertain to the environmental analysis of the Draft EIR.

IV. TEXT REVISIONS

Section A of this chapter presents specific revisions to the text of the Draft EIR that are being made in response to comments, or to amplify and clarify material in the Draft EIR. Where revisions to the main text are called for, the page and paragraph are set forth, followed by the appropriate revision. Added text is indicated with underlined text. Deletions to text in the Draft EIR are shown with ~~strikeout~~. Page numbers correspond to the page numbers of the Draft EIR. Section B presents revisions initiated by the City to the cumulative traffic analysis. The cumulative analysis for traffic is being revised because the City's significance criterion for cumulative traffic impacts was invalidated by the Superior Court of California subsequent to the publication of the Draft EIR.

None of the changes or clarifications presented in this chapter significantly alters the conclusions or findings of the Draft EIR.

A. REVISIONS MADE IN RESPONSE TO COMMENTS ON THE DRAFT EIR

Page 23 of the Draft EIR is revised as follows:

> In June 2002, prior to the passage of Measure DD, the City analyzed the measure's potential environmental effects in an Initial Study that relied upon previous environmental documents prepared by the City. The previous environmental documents included the Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element Mitigated Negative Declaration, the General Plan Land Use and Transportation Element (LUTE) EIR, the Estuary Policy Plan EIR, and the Coliseum Redevelopment Plan Area EIR. Based on the environmental analysis, the City found that all potentially significant effects would be avoided or mitigated by mitigation measures required by ~~in~~ previously prepared CEQA documents. As a result, because none of the circumstances calling for preparation of a subsequent or supplemental EIR were present, ~~and thus~~ the City prepared an Addendum to the previous environmental documents.

Page 24 of the Draft EIR is revised as follows:

> ~~As of this writing, there is a pending lawsuit that challenges the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. The City has not implemented these approvals during the pendecy of the lawsuit.~~ At the time the Draft EIR was published in July 2007, a lawsuit was pending that challenged the granting of three permits for tree removal around Lake Merritt, and another CEQA document, the 2006 Lake Merritt Channel Wetlands and Widening Project EIR. On October 10, 2007 subsequent to the close of the public review period for the Draft EIR, the Superior Court of California, County of Alameda, upheld the tree permits and the City's CEQA determination for the tree permits ruling that "substantial evidence does not exist in the record to support a fair argument that the issuance of the tree permits may have a significant effect on the environment requiring an EIR be prepared." The

court also dismissed the challenge to the Channel Wetlands and Widening Project EIR and entered judgment in favor of the City. Thereafter, the City removed some trees around Lake Merritt, including those along Lakeshore Avenue and Lakeside Drive near the Municipal Boathouse pursuant to the permits. None of these removals (nor any other circumstances occurring subsequent to circulation of the Draft EIR) alter the EIR's analysis or conclusions. The EIR acknowledges that the tree removals will occur and new trees will be planted in accordance with the previously issued permits.

Page 30 of the Draft EIR is revised as follows:

The City is proposing to renovate existing plantings and irrigation around the 12th Street component site. This includes removing approximately 157 existing trees from the median strip along 12th Street, the Kaiser Convention Center parking lot and some areas along the banks of the Lake Merritt Channel and replanting these areas with approximately 321 new trees and other landscaping. The final numbers of trees removed or planted may differ slightly from these counts. Some trees will ~~would~~ be removed because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees reaching the end of their life expectancy. Figure III-3 shows the area where trees are ~~proposed~~ to be removed as part of this project component. As part of the project design process the City hired a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ around Lake Merritt and the Lake Merritt Channel. The arborist recommended preserving four trees in this area by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project. The arborist's report is provided in Appendix I.

Pages 35 and 36 of the Draft EIR are revised as follows:

As part of the Measure DD Implementation Project, the City proposes to widen the Channel, streambed, stream banks and upland areas between Lake Merritt and the Estuary by removing the 10th Street culvert and 12th Street culvert (discussed above) and grading the Channel's banks, thus creating additional areas of open water and tidal marsh as shown in Figure III-4. The bottom of the channel at 12th Street would be lowered. Shoreline improvements (e.g., pedestrian pathways and tidal marsh) along the channel between 12th Street and I-880 would be similar in design to those ~~to the designs~~ proposed for the 12th Street project component. The existing pedestrian bridge below 10th Street would be refurbished or replaced. At 7th Street, the pedestrian tunnel on the east side of the trail would be refurbished and the pedestrian tunnel on the west side would be relocated to allow construction of the new bypass channel. A new traffic signal and crosswalk across 7th Street is proposed. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. The trail south of 7th Street would be refurbished but would otherwise remain unchanged. On the east side of the Channel the trail merges into the parking lot south of Peralta College District offices; on the west, the trail passes under I-880 and connects to the dead end of 4th Street.

The City will ~~is proposing to~~ remove some existing trees (approximately 58) along the channel as shown in Figure III-5. Invasive exotic plants, such as *Spartina,* would be removed

if present along the shoreline and new intertidal and upland plantings consisting of native plants such as pickleweed (lower marsh areas), marsh gumplant, and salt grass (upper marsh areas and transitional zones characterized by native grasses), and shrubs and trees would be planted to restore the natural ecosystem of the Channel. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. The City also is proposing to install biofiltration basins to improve water quality. Typical construction activities would include clearing, grading, excavating, pile driving, and replanting of landscaping using various pieces of construction equipment and by hand labor. ~~This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt.~~

Page 36 of the Draft EIR is revised as follows:

This reconfiguration would include the continuation of pathways established as part of the 12th Street and 10th Street project components, the improvement of pedestrian tunnels under 7th Street, and the installation of a new traffic signal and crosswalk across 7th Street. The 7th Street project component proposes the creation of a bypass channel to improve recreational access, as well as to allow large fish to once again enter the upper Lake Merritt Channel and Lake Merritt. The bypass channel would be designed and managed to retain the tidal and flood control functions of the pump station. To ensure that the flood control function of the 7th Street Pump Station is not compromised, the new bypass channel would include a hydraulic gate that would be closed when operation of the pumps is required to lower the water level in the lake.

Page 41 of the Draft EIR is revised as follows:

(2) Lakeshore Avenue Variant B. Lakeshore Avenue Variant B proposes to re-stripe the street to create one travel lane in each direction, a Class 2 bike lane in each direction, a continuous left-turn lane down Lakeshore Avenue, and parking lanes along both curbs. A planting strip, including street trees, would be included along the park border. A multi-use path would be installed between the planting strip and the park landscaped area. As with Variant A, park landscaping would be renovated ~~and the removal of~~ with some trees removed~~is proposed~~. The surface of the lakeside path would be resurfaced with stabilized decomposed granite and would be widened at the narrow spots. The pedestrian crossing at Cleveland Cascade would be improved and mid-street pedestrian islands would be included at intersections as appropriate. Typical construction activities would include paving, grading, path resurfacing and replanting of landscaping.

(7) Landscaping Improvements. Approximately 9 acres of existing planting and irrigation are proposed to be renovated along Lakeshore Avenue. This renovation ~~would~~ includes removing approximately 24 existing trees and planting approximately 135 new trees. The final numbers of trees removed or planted may differ slightly from these counts. As part of the project design process the City hired a certified arborist to evaluate the trees to be

removed ~~proposed for removal~~ around Lakeshore Avenue. The arborist recommended preserving one tree in this area by relocating it. The City has incorporated this recommendation into the project. The arborist's report is provided in Appendix I. The trees were identified for removal ~~would be removed~~ because they are diseased, have severe structural defects, are crowding buildings, conflict with the new construction or are fast-growing, short-lived trees reaching the end of their life expectancy. Landscaped areas with shrubs and ground cover would replace the existing lawn in narrower parts of the park corridor. This substitution would reduce maintenance and water use and reduce the attractiveness of the area to Canada geese. Hardscape development, including benches and patios, would be added at creek nodes and areas where small peninsulas jut out into the Lake. Figure III-7 shows a proposed landscaping plan, which indicates where trees would be removed and new trees would be planted.

Page 47 of the Draft EIR is revised as follows:

Approximately 4 acres of existing planting and irrigation are proposed to be renovated along Lakeside Drive and around the Boathouse. This renovation ~~would~~ includes removing approximately 20 existing trees and planting approximately 65 new trees. The final numbers of trees removed or planted may differ slightly from these counts. The trees were identified for removal ~~would be removed~~ because they are in conflict with the new construction, are diseased, have severe structural defects or are fast-growing, short-lived trees that have reached the end of their life expectancy. Figure III-9 shows the proposed landscape plan, which indicates the locations of ~~where~~ tree removals ~~would be removed~~ and new tree plantings ~~would be planted~~.

Page 52 of the Draft EIR is revised as follows:

a. General Trail Characteristics. Most of the 6.6 miles of trail would be paved with asphalt or concrete, with minimal grading so as to minimize disturbance of the ground surface. At some locations, invasive exotic plants, such as *Spartina*, would be removed if present along the shoreline. Control measures for *Spartina* would include those approved by the San Francisco Estuary Invasive Spartina Project. Some portions of the existing Bay Trail between Jack London Square and 66th Avenue may be repaired to fix broken pavement, lighting, or signage. The trail would vary from a minimum 12-foot-wide combined use trail where space is constrained to a pair of bike and pedestrian trails separated by a landscaped median, with a total width of up to 40 feet. At points of interest, additional landscaping would be planted. Various types of decorative and informational wayfaring signage would be installed along the trail.

Some segments of the trail are already complete or will be completed as part of other projects. These segments include:

- Lake Merritt Channel to 10th Avenue Marina – segment will be completed as part of the Oak to 9th Project.
- Livingston Pier to Cryer Site – trail segment is complete
- Park Street Bridge to Derby Avenue – trail segment is complete

- U.S. Audio Technologies to High Street – trail segment is complete
- Gallagher & Burk/Hanson Aggregate to 66th Avenue Gateway – trail segment is complete, except for the northern-most portion

Figures III-10a and III-10b on pages 53 and 54 of the Draft EIR are revised as shown in Chapter 3 (pages 59 and 61) of this Response to Comments document.

Page 57 of the Draft EIR is revised as follows:

(14) Gallagher & Burk/Hanson Aggregate Trail Connection. The proposed segment of the trail adjacent to the Gallagher & Burk asphalt plant would be a concrete pier supported walkway. As the Hanson Aggregate facility uses water access for delivery of materials, the trail would be designed to allow materials to be transferred from barges to the site while allowing for shoreline trail access. This would include the construction of a steel canopy over a portion of the trail. Property easements are being sought for this segment of the trail, but operational constraints may preclude completing this segment of the trail while the facility is in operation. An interim route may include a connection to Tidewater Avenue, which is analyzed in the Section V, Alternatives.

Page 93 of the Draft EIR is revised as follows:

Policy Rec-4.1	**Systematic Maintenance Provisions.** Provide for ongoing, systematic maintenance of all parks and recreational facilities to prevent deterioration, ensure public safety, and permit continued public use and enjoyment. Routine maintenance needs should be evaluate on a regular basis. Parks which receive very heavy use should receive more frequent maintenance than those with less use.	*Lake Merritt and Lake Merritt Channel:* The project provides funding to renovate the Boathouse, Pergola, 18th Street Pie, which are consistent with the long-term upkeep of parks and recreational facilities. *Waterfront Trail:* The project provides funding to renovate existing trails as well as to construct new trails. *Recreational Facilities:* The project provides funding to renovate Studio One. *City-wide Creeks:* N.A.

Page 95 of the Draft EIR is revised as follows:

e. San Francisco Bay Plan. The San Francisco Bay Plan[9] (Bay Plan) is a policy tool that, under the provisions of the McAteer-Petris Act, allows the San Francisco Bay Conservation and Development Commission (BCDC) to "exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction," an area that includes all of the San Francisco Bay, a shoreline band of 100 feet from the water, and salt ponds, managed wetlands and certain waterways associated with the Bay. The Bay Plan stipulates: "Any public agency or private owner holding shoreline land is required to obtain a permit from the Commission before proceeding with (shoreline) development." The Bay Plan contains findings and policies that will apply in BCDC permits for Measure DD project components within the commission's jurisdiction. Examples of applicable policies include those related to public access, the placement and removal of fill in the Bay, sea level rise and the safety of fills, the protection of fish, other aquatic organisms and wildlife, and tidal marshes and tidal flats, among others. Implementation of the proposed project would require BCDC permit

approval for development within the 100-foot shoreline band. Measure DD includes waterfront improvements within 100 feet of the shoreline~~.~~, including areas along the Oakland Estuary and the southern portion of the Lake Merritt Channel, downstream of the 7th Street Pump Station.

Page 121 of the Draft EIR is revised as follows:

City of Oakland General Plan. The Land Use and Transportation Element (LUTE) of the General Plan has numerous policies related to transportation issues. The primary LUTE policies relevant to transportation, circulation and parking, including those provided in the City's Bicycle Master Plan and Pedestrian Master Plan (which are part of the LUTE), include the following:

Page 122 of the Draft EIR is revised as follows:

- Policy D13.2: An adequate quantity of car, bicycle, and truck parking, which has been designed to enhance the pedestrian environment, should be provided to encourage housing development and the economic vitality of commercial, office, entertainment, and mixed use areas.
- BMP Policy 1: Create, enhance and maintain the recommended bikeway network.
- BMP Policy 2: Establish design and maintenance standards for all streets that recognize the needs of bicyclists.
- BMP Policy 4: Include provisions for safe and direct bicycle access to special development areas and key corridors.
- BMP Policy 8: Ensure that the needs of bicyclists are considered in the design of new development and redevelopment projects.
- PMP Policy 2.1: Route Network: Create and maintain a pedestrian route network that provides direct connections between activity centers.

Page 130 of the Draft EIR is revised as follows:

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing safety features would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

Page 133 of the Draft EIR is revised as follows:

Transit Recommendations

- The City should provide active and/or passive transit signal priority to reduce travel times along 12th Street and Harrison Street. This action would reduce delays for AC Transit but not completely eliminate increases in travel time along 12th Street and Harrison Street.

- The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.

Page 139 of the Draft EIR is revised as follows:

Pedestrians and bicyclists would cross the UPRR tracks along 5th Avenue and Oak Street when traveling between project elements in the Lake Merritt area and the Waterfront Trail. Currently, the crossings have safety equipment including crossing gates and warning lights. These facilities control access by pedestrians as well as vehicles. There is also a chain link fence along Embarcadero, which prevents crossings by pedestrians at other locations. With the implementation of the Measure DD improvements, these existing facilities would remain in place. Thus, the project would not increase hazards to vehicles, pedestrians, or bicyclists. The impact would be less than significant.

Pages 139-140 of the Draft EIR is revised as follows:

Transit Recommendations

- Implementation of active and/or passive transit signal priority as described in the previous recommendations for transit service would reduce delays for AC Transit. Nevertheless, the implementation of transit signal priority is not expected to completely eliminate increases in travel time along the 12th Street and Harrison Street. ~~While adding bus-only lanes or queue jump lanes, or eliminating pedestrian crosswalks are feasible, they are not recommended because they would have substantial impacts on traffic operations or pedestrian mobility, and in most cases have additional costs.~~
- The City should provide an eastbound bus lane along the right side of 11th Street with the bus lane continuing through the signal at the 11th-12th/14th Street intersection.

Page 142 of the Draft EIR is revised as follows:

Traffic and Maritime Hazards. Implementation of the proposed project would result in the Bay Trail passing under the bridges. Therefore, the project would not result in any significant impacts related to traffic hazards as the trail would not conflict with vehicular circulation. To the extent feasible the proposed trail segments that would pass beneath the Park Street and High Street bridges would not extend further into the channel than the existing bridge fenders. At all bridges, trail segments would be kept as close to the shoreline as necessary to ensure public safety and not impede navigation. However, the U.S. Coast Guard and others have raised concerns about the potential safety and feasibility of a trail being constructed under the bridges, particularly the High Street and Park Street bridges. Recognizing that the U.S. Coast Guard has permitting authority in these areas, the City includes street-level crossings in these areas as part of the alternative for the Waterfront Trail Group, described in Section V.F, Waterfront Trail Surface Street Connection Alternative.

Page 155 of the Draft EIR is revised as follows:

(4) Odors. Odors are also an important element of local air quality conditions. Specific activities can raise concerns on the part of nearby neighbors. Major sources of odors include restaurants, manufacturing plants, and agricultural operations. Other odor producers include the industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. While sources that generate objectionable odors must comply with air quality regulations, the public's sensitivity to locally produced odors often exceeds regulatory thresholds.

Page 159 of the Draft EIR is revised as follows:

(5) Objectionable Odors. The operation of the project components of Measure DD would not generate objectionable odors. Typically, major sources of odors include restaurants, manufacturing plants, and landfills. Other odor producers include industrial and transportation facilities within the region, such as railroads that may produce mechanical odors. The proposed project components include physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration projects which are not expected to generate objectionable odors. The project may briefly bring people into proximity with industrial or transportation facilities that produce odors along the Waterfront Trail, but exposures would be brief and affect a relatively small number of people on an occasional basis. Therefore, the project would not frequently create substantial objectionable odors affecting a substantial number of people. The information provided in the comment does not change the analysis or conclusions of the Draft EIR. This potential impact would be less than significant.

Page 181 of the Draft EIR is revised as follows:

(4) Vibration. None of the four project groups contain components that would generate ground-borne vibration levels that would be perceptible to the average person. ~~There would be no impact during the project's operational phase.~~ The project may briefly bring people into proximity with transportation facilities along the Waterfront Trail, such as railroad tracks, that produce ground-borne vibration. But the project would not frequently expose a substantial number of people to ground-borne vibration. Construction activities associated with implementation of the project, including proposed pile driving activities, could temporarily expose persons in the vicinity of the proposed project construction areas to ground-borne vibration or ground-borne noise levels. However, the project would comply with the construction hours specified in the City's Noise Ordinance and the City's standard Conditions of Approval would be applied. Implementation of the Conditions of Approval would ensure potential ground-borne vibration would be avoided or reduced to a less-than-significant level.

Page 204 of the Draft EIR is revised as follows:

(4) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to

enforce this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters. In reviewing permit applications, BCDC relies on findings and policies on fish, other aquatic organisms and wildlife in the Bay Plan to ensure protection of biological resources.

Page 211 of the Draft EIR is revised as follows:

(1) Candidate, Sensitive, or Special-status Species. The only special-status species potentially occurring within all component groups is Cooper's hawk, a California Species of Special Concern. The numerous tall trees throughout the Measure DD Implementation Project area provide nesting habitat for a variety of native bird species, potentially including Cooper's hawk. In addition, some of the creek restoration sites in the upper Oakland watershed may contain suitable nest trees for sharp-shinned hawk. Both these species are California Species of Special Concern. ~~Proposed t~~Tree removal within the Lake Merritt and the Lake Merritt Channel group area and potential tree removal within other group sites could directly impact nesting Cooper's and sharp-shinned hawks by removing trees that support active nests. Prolonged loud construction noise could also disturb nesting birds, resulting in nesting failure and/or nest abandonment.

Implementation of the City's Standard Conditions of Approval (Condition 32) will reduce potential impacts to nesting Cooper's and sharp-shinned hawks to a less-than-significant level. The pre-construction survey shall be conducted within 15 days prior to the start of work from March 15 though May (since there is higher potential for birds to initiate nesting during this period), and within 30 days prior to the start of work from June through August 15.

Page 213 of the Draft EIR is revised as follows:

(6) Protected Trees. Based on current plans, the Lake Merritt and Lake Merritt Channel group includes removal of ~~proposes to remove~~ a number of ~~protected~~ trees protected under the City's Tree Ordinance. Protected trees might also be removed as part of the Waterfront Trail, Recreational Facilities, and City-wide Creeks groups. This impact is discussed in Section IV.F2c.

The following text is inserted on page 216 of the Draft EIR at the end of subsection IV.F.2.c(3):

The increased tidal flows that would occur as a result of the proposed modifications to the Lake Merritt Channel are not expected to cause adverse changes to the open water habitat in Lake Merritt or the Lake Merritt Channel. Increased tidal flows would not adversely affect the relevant water quality characteristics of the open water habitat such as salinity, temperature, and dissolved oxygen. Water quality, especially dissolved oxygen, would be improved by the greater exchange rate between Lake Merritt and the estuary and by newly created tidal wetlands in the channel, which would benefit wildlife.

Page 216 of the Draft EIR is revised as follows:

(4) Native Resident or Migratory Wildlife Movement, Wildlife Corridors, or Nursery Sites. As the channel is not a corridor for the movement of migratory fish, the proposed changes to Lake Merritt and Lake Merritt Channel would not have an adverse effect on migratory fish species. Several species of migratory waterbirds have been observed using the Lake Merritt Channel during the winter (approximately October through March), often in flocks of 40 to 70 birds (e.g., scaup, common goldeneye). A 2004 study of waterbird use and disturbance response within Berkeley's Aquatic Park found that disturbance sensitivity was positively related to flock size, with large flocks flushing more readily than smaller ones.[37] Although no such studies have been conducted at the Lake Merritt Channel, LSA observed a flock of approximately 50 common goldeneyes swimming away from a group of schoolchildren crossing the pedestrian bridge during the January 19 site visit, indicating sensitivity to disturbance. Human-caused disturbance negatively affects wintering ducks by causing the expenditure of energy (i.e., flying or moving away from the source of disturbance) that would otherwise be used for behaviors necessary for survival, such as resting or feeding.[38] Repeated or periodic disturbance would cause a greater expenditure of energy and thus have a greater effect on wintering birds than singular events.

Page 218 of the Draft EIR is revised as follows:

(6) Protected Trees. In order to create additional parkland along the south shore of Lake Merritt and make other improvements around the Lake, approximately 259 trees, including 129 protected trees, are to ~~would~~ be removed and 521 new trees and other landscaping are to ~~would~~ be installed to replace them. Approximately 510 existing trees will ~~would~~ be retained. Overall, the trees will ~~would~~ be replaced at about a 2:1 ratio, that is, two trees will ~~would~~ be planted for each tree removed. Table IV.F-3 summarizes the ~~proposed~~ tree removals and new plantings by project component within the Lake Merritt and Lake Merritt Channel project group. As part of the project design process the City engaged a certified arborist to evaluate the trees to be removed ~~proposed for removal~~ in this group. The arborist recommended preserving five trees by redesigning the project or by relocating some of the trees. The City has incorporated these recommendations into the project and the numbers in Table IV.F-3 reflect the preservation of these trees. The arborist's report is provided in Appendix I.

Table IV.F-3: ~~Proposed~~ Tree Removals for the Lake Merritt and Lake Merritt Channel Project Group

Project Component	Trees to be Retained[a]	Trees to be Removed ~~Proposed for Removal~~	Protected Trees to be Removed ~~Proposed for Removal~~	New Trees to be Planted	Ratio of Trees Planted to Trees Removed
Lakeside Drive/Municipal Boathouse	30	20	17	65	3.25
Lakeshore Avenue/El Embarcadero	90	24	6	135	5.4
12th Street Reconstruction	50	157	90	321	2.0
Lake Merritt Channel	340	58	16	0[b]	0
TOTAL	**510**	**259**	**129[c]**	**521**	**2.0**

[a] Numbers of trees are approximate. Totals include trees recommended for preservation or relocation by the certified arborist.

[b] No new trees will ~~would~~ be planted along the Channel because the habitat type would be converted from landscaped urban parkland to wetlands and open water.
[c] Includes eight protected oak trees.
Source: HortScience, 2007.

The City of Oakland's Tree Preservation and Removal Ordinance (OMC Chapter 12.36) requires a permit for removal of protected trees. A permit is also required if work might damage or destroy protected trees. The project will ~~would~~ comply with the Tree Preservation and Removal Ordinance and ~~would~~ obtain permits for the removal of any protected trees. In addition, the City considers other factors in determining significance for purposes of CEQA including: the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, with special consideration given to native trees, as discussed below.

The majority of protected trees to be removed are located in the 12th Street reconstruction area. Although protected trees are present in this area many of the trees are in poor or fair condition (see Appendix I); are in the landscaped median strip for 12th Street that is accessible only via rarely used pedestrian underpasses; or are in small planting strips within the parking lot for the Kaiser Convention Center (see Figure III-3). Most of the trees are non-native ornamental species. When the project components around Lake Merritt are looked at as a whole, about twice as many trees are retained in the project area as are to ~~would~~ be removed and approximately two trees will ~~would~~ be planted for each tree removed. The new trees in the 12th Street reconstruction area will ~~would~~ be part of proposed landscaped areas that would have direct pedestrian access to Lake Merritt and surrounding civic buildings. The four components of Group 1 (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and Lake Merritt Channel) either retain more trees than they ~~would~~ remove and/or plant at least twice as many new trees as are ~~would be~~ removed (Lakeside Drive/Municipal Boathouse, Lakeshore Avenue/El Embarcadero, and 12th Street Reconstruction). Eight trees to be removed are protected native oak trees.

The project would not fundamentally conflict with the City of Oakland's Tree Preservation and Removal Ordinance and would therefore be a less-than-significant impact for the following reasons: approximately twice as many trees will ~~would~~ be retained as will ~~would~~ be removed; removed trees will ~~would~~ be replaced at approximately a 2:1 ratio; the majority of trees to be removed are in poor or fair condition; and many are located in a parking lot or an inaccessible median strip. In addition, because trees are being replaced at approximately a 2:1 ratio many benefits lost by the removal of trees, such as aesthetics, energy conservation, reductions in stormwater runoff, improvements in air quality, and capture of carbon dioxide (a greenhouse gas) will ~~would~~ be compensated for in a few years because of the large number of new trees being planted. The impacts of removing trees and the benefits of planting new trees in the Lake Merritt and Lake Merritt Channel group were estimated quantitatively using a computer application developed by scientists at the United States Department of Agriculture (USDA) Forest Service's Pacific Southwest Research Station to assess populations of street trees.[1] The results of this study are provided in Appendix I. Because the City would comply with the Tree Preservation and Removal Ordinance, the Lake Merritt and

[1] USDA Forest Service. http://www.itreetools.org/street_trees/introduction_step1.shtm.

Lake Merritt Channel project components would have a less-than-significant impact. To reach this conclusion, the City considered the number, type, size, location and condition of the protected trees to be removed and/or impacted by construction and the protected trees to remain, including native trees.

A small number of protected trees may require removal as part of the Waterfront Trail, Recreational Facilities, City-wide Creeks groups or other components of the Lake Merritt group (e.g., the Cleveland Cascade). The trees would be replaced in accordance with the City's Tree Protection Ordinance and Standard Conditions of Approval (Condition 32), which would reduce the impact to a less-than-significant level.

Page 261 of the Draft EIR is revised as follows:

- As with many facilities built near the shore of San Francisco Bay, rising sea levels associated with global climate change could, in the long-term, affect project facilities and existing infrastructure such as the 7th Street Pump Station that are designed to protect them from flooding. The pump station's function would be compromised if, for example, tidal levels overtopped the facility. However, the flood control components and operation of the 7th Street Pump Station itself would not be altered by the project. New trails are being located above the current reach of tidal action, with additional freeboard which will accommodate some future sea level rise. In addition, the project is not constructing housing, high occupancy, or sensitive facilities within the zone that could be affected by flooding or rising sea levels.

Substantial quantities of new impervious surfaces, which could increase runoff rates and velocities (and potentially flooding), would not be created by Measure DD project components. The integrity and function of existing flood control and stormwater conveyance facilities operated by the Alameda County Flood Control and Water Conservation District, such as stormwater outfalls at Lake Merritt, would be ensured by obtaining permits and authorizations from the District prior to construction as required by Condition of Approval 75. ~~Construction of housing is not a proposed element of the project, and no new residential development would be subject to flooding.~~ Therefore, no substantial impact related flood hazard or redirection of flood water would occur with the proposed Measure DD components.

Pages 263 and 264 of the Draft EIR are revised as follows:

These three components are designed to improve tidal exchange between Lake Merritt and San Francisco Bay by clearing and broadening the channel to approximately 100 feet at the outlet from Lake Merritt and at 10th Street. New clear-span bridges would be constructed after removal of existing culverts under 12th and 10th streets. ~~and by reconfiguring the channel at 7th Street~~, The proposed changes would ~~resulting in~~ approximately double~~ing~~ the flow rate through the Lake Merritt Channel in this area.[50, 51] These components are also intended to improve pedestrian and bicycle circulation in the area of the Channel, and along with other components, enhance and improve the environment of Lake Merritt and surrounding parks. Redesign of the Channel at the Lake Merritt Flood Control Station at 7th Street is at the conceptual design stage. As noted previously, hydraulic studies conducted at this stage of project development indicate that the proposed changes to the Lake Merritt Channel would help alleviate flooding conditions. Nevertheless, as required by Condition of Approval 75 this

project component would be required to obtain all necessary permits and authorizations from the Alameda County Flood Control and Water Conservation District prior to construction to ensure that the operation of the flood control facilities at 7th Street would not be adversely affected by the proposed action. Topics of wildlife, aquatic life, vegetation, landscaping, creek restoration, U.S. Army Corps of Engineers Section 404 (filling and grading in wetlands) permitting, California Department of Fish and Game Section 1604 – Streambed Alteration Agreements, and San Francisco Bay Conservation and Development Commission (BCDC) requirements are addressed in the Biological Resources section of this DEIR.

Page 311 of the Draft EIR is revised as follows:

Adams Park and the Veterans Memorial Building are located at the northwest corner of Lake Merritt at Harrison Street and Grand Avenue and provide space for private events and senior activities. Lakeside Park at Grand Avenue and Bellevue Avenue includes a Lawn Bowling Clubhouse and Greens, non-programmed open space, Children's Fairyland, McElroy Fountain and Specimen Groves, ~~Edhoff Band Stand~~Edoff Memorial Bandstand, a beach, amphitheater, Garden Center, Junior Center of Art & Science, the Sailboat house, the Rotary Nature Center, OPD horse stables, and wildlife areas.

Page 325 of the Draft EIR is revised as follows:

Wastewater generated by the Measure DD Implementation Project components represents less than 0.1 percent of the MWWTP's secondary treatment capacity. ~~This wastewater would be accommodated by the MWWTP, which is currently operating at 48 percent of its secondary treatment capacity. The increase in wastewater generated by these projects is not substantial in the context of the entire volume of wastewater processed by EBMUD's Main Wastewater Treatment Plant.~~ EBMUD has sufficient capacity to treat wastewater flows from the projects during dry weather[19] and would not require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

Page 336 of the Draft EIR is revised as follows:

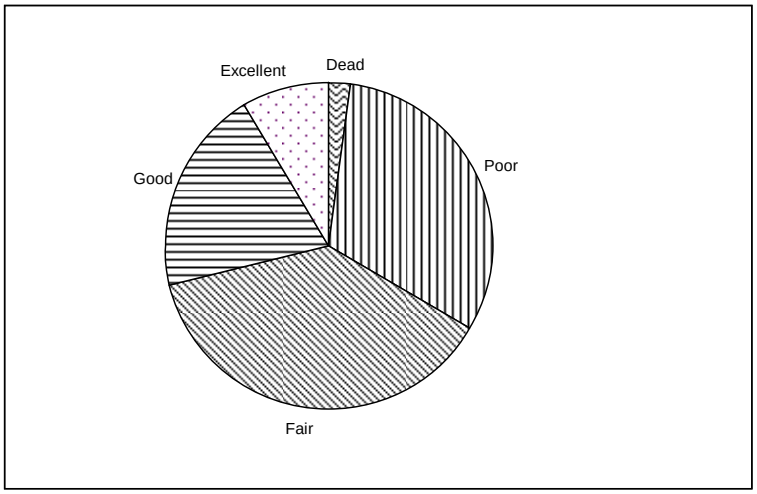
Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and the Lake Merritt Channel are resources that are part of scenic vistas seen from numerous locations in Oakland, including the City's Downtown and hillside areas. The proposed project would result in beneficial impacts to the visual quality of the Lake through water quality control measures, the restoration of historic buildings and monuments around the perimeter of the Lake, and enhanced landscaping. These changes to the Lake and the Channel would result in small but beneficial improvements to scenic vistas encompassing these waterways. ~~The project would result in the r~~Removal of certain ~~diseased~~ trees from the vicinity of the Lake is consistent with and in furtherance of the project.~~;~~ The removal of these trees will enhance the visual character of the Lake and~~; however, the removal of these trees~~ will ~~would~~ not substantially adversely change scenic vistas. New trees will ~~would~~ be planted to replace the trees that are removed, and these trees will not substantially block scenic vistas. No structures would be built that would block surroundings and would not block scenic views of the

Estuary. Therefore, this group of project components would have a less-than-significant impact on scenic vistas.

Page 341 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). A key component of this group is the various proposed water quality control measures, including the installation of devices and features to clean and circulate water, and the creation of an open channel to allow for increased tidal flow into and out of the Lake. These measures, by improving water quality in the Lake, would enhance the scenic qualities of the waterway (including portions of the Lake visible from I-580), which suffers from algal blooms and stagnation associated with a surplus of nutrient-rich pollution. In addition, this group would involve the renovation of existing landscaping, which would improve the landscape context of the Lake. ~~As part of the project, certain trees would be removed (and replaced with healthy individuals).~~ Based on the Tree Assessment prepared by HortScience, Inc. (Appendix I), of the 269 trees that will be removed as part of the project, 6 are dead, 84 are in poor condition, 101 are in fair condition, 55 trees are in good condition, and 23 trees are in excellent condition (see Chart IV.M-1). As shown in Chart IV.M-1, ~~M~~many of the trees considered for removal ~~that would be removed~~ are diseased, short-lived, or are not stable (i.e., they are dead, or in poor to fair condition). Although some of the trees subject to removal may ~~that would be removed~~ contribute or may have contributed to the scenic quality or overall visual character of the Lake, this contribution is not significant either individually or cumulatively. In context, approximately 500 trees will be retained in the project area and the 521 trees will be planted as part of the project (a replacement ratio of almost two trees for every removed tree). These replacement trees will fill in any visual "gaps" created by the removed trees. As shown in Figures IV.M-1 through IV.M-4, the removal of trees from the site will not adversely affect scenic resources or visual character as seen from key viewpoints around Lake Merritt.

Chart IV.M-1: Tree Condition and Frequency of Occurrence



Source: HortScience, Inc., 2007.

This conclusion is also supported by a cost/benefits analysis of tree removal/replacement conducted by HortScience as part of the Tree Assessment. Using a model that takes into

account the environmental and economic benefits of trees (including improvement of visual quality, reductions in storm water runoff, improvements in air quality, and sequestration of carbon dioxide), HortScience determined that the trees subject to removal from the site provide an estimated $29,438 in annual benefits, approximately 77 percent of which ($22,866) is associated with aesthetic value. At planting, the 521 replacement trees will provide an estimated $22,986 in annual benefits, "almost entirely due to aesthetic and other benefits." As the trees mature, the value of their annual benefits will increase to $33,193 at 5 years and $40,700 at 20 years. Therefore, based on the model, within only 5 years of planting, the replacement trees will be more valuable in terms of aesthetics and other environmental/ economic benefits than the existing trees that will be removed as part of the project. Although there are limitations with assigning monetary values to resources like trees (i.e., resource valuation generally lacks a reliable way to estimate the value of ecological damage), the data produced by HortScience suggest that the aesthetic costs of tree removal do not outweigh the benefits of tree replacement. Based on the HortScience analysis, and an understanding of tree removal in the context of trees that will be preserved and trees that will be replaced as part of the project, ~~Therefore,~~ the removal of select trees and the replacement with new individuals would not be considered a significant impact to scenic resources or the visual character of the project site.

Page 342 of the Draft EIR is revised as follows:

Lake Merritt and Lake Merritt Channel (Group 1). Lake Merritt and its surroundings are characterized by a semi-formal landscape of rolling lawns and walkways, all oriented around the water body itself. While the area has high visual quality, the aesthetics of the area are diminished primarily by low water quality in the Lake, landscaping and trees that are in poor condition, and roadways surrounding the Lake that are disproportionately wide and emphasize automobile traffic at the expense of the pedestrian environment. The proposed project would substantially improve these adverse conditions. First, the removal of the 12th Street culvert and the implementation of the various water quality control measures would improve the water quality of the Lake, and enhance the potential for the growth of native vegetation and use of the water body by native wildlife (besides Canada geese). Second, landscaping and trees in poor condition will ~~would~~ be removed and replaced with new plants that would enhance the visual environment. Third, several roadways (including 12th Street, Lakeshore Avenue, and Lakeside Drive) would be reconfigured and/or narrowed to include bike lanes and pedestrian paths. These changes would reduce the visual intrusion of motor vehicles and would improve the visual environment for the bikers and walkers that comprise the key users of Lake Merritt. Lastly, historic buildings around the Lake, some of which are in poor condition, would be rehabilitated. At the Municipal Boathouse, two parking lots next to the Lake and Boathouse would be removed and replaced with landscaping, terraces, and pathways. A smaller parking lot would be constructed closer to the road and the remaining parking would be relocated along Lakeside Drive itself. The improvement and preservation of historic structures, and the modification of parking areas would benefit the visual quality of the area, including the lakeshore itself. Therefore, the project group would have a less-than-significant impact on the existing visual character of the area surrounding the Lake and Lake Merritt Channel.

Page 352 of the Draft EIR is revised as follows:

For Group 1, the No Project alternative would include completion of the Pergola, Children's Fairyland, the E. 18th Street Pier, and Municipal Boathouse renovations. However, paths, landscape improvements and additional patron parking (for the Boathouse) that would provide improved access to the facilities would generally not be constructed. The land around Lake Merritt would continue to be used as park land. Landscape maintenance, including the removal and replacement old or diseased trees, would continue as needed. Trees will be removed along Lakeshore Avenue, Lakeside Drive and the 12th Street reconstruction area in accordance with the permits for the removal of trees previously issued by the City. ~~The tree replacement process would generally maintain the current appearance of the park, but no substantial increase in landscaped area or number of trees is likely to occur because there would be no net increase in parkland as would occur if the project were constructed as proposed.~~ The creation of bike lanes by restriping Lakeside Drive and Lakeshore Avenue might occur as part of other projects, but associated landscaping and pedestrian path improvements would not be constructed.

Table V-1 on page 353 of the Draft EIR, is revised as follows:

Table V-1: No Project Alternative (Groups 1 and 2): Components Completed or In Progress and Components Unbuilt

Lake Merritt and Lake Merritt Channel (Group 1)
Components Completed or In-Progress
• Pergola Renovation (complete)
• Installation of a Fire Protection Main (complete)
• Water Quality Improvements, including storm drain filters at Bellevue/Staten, 27th/Valdez, and 22nd/Valley; pilot air diffuser project; new aeration fountain; Pergola fountain (complete)
• Children's Fairyland Renovations (in-progress)
• Municipal Boathouse Renovation (in-progress)
• E. 18th Street Pier Improvements (in-progress)
• Tree removals along Lakeshore Avenue and Lakeside Drive
Unbuilt Components
• 12th Street Improvements
• Lake Merritt Channel
• Lakeshore Avenue~~,~~ and El Embarcadero~~, and E. 18th Street Pier Improvements~~
• Lakeside Drive
• Snow Park and Lakeside-Harrison-20th Street Intersection
• Bellevue Avenue Redesign
• Sailboat House
• All water quality improvements except those noted above
Oakland Waterfront Trail (Group 2)
Components Completed or In-Progress
• Union Point Park
• Park Street Triangle traffic study
• Alameda Avenue south of Fruitvale Avenue
• 66th Avenue Gateway
Unbuilt Components

Lake Merritt and Lake Merritt Channel (Group 1)
• Estuary Park • 10th Avenue Marina • Brooklyn Basin • Brooklyn Basin to Embarcadero Cove • Livingston Pier • Cryer Site • ConAgra to Park Street Bridge • Bridge boardwalks at Park Street, Fruitvale Avenue and High Street • Derby Avenue to Lancaster Street (Oakland Museum Women's Board warehouse) • ~~Alameda Avenue south of Fruitvale Avenue~~ • US Audio/Capture Technologies and friendly Transportation Trail Connection • Gallagher & Burk/Hanson Aggregate Trail Connection • ~~66th Avenue Gateway~~

Page 356 of the Draft EIR is revised as follows:

> Although the City has a permit for tree removals in the 12th Street reconstruction area, as of this writing, none has been removed. The alternative would reduce the number of trees that will need to ~~would~~ be removed to allow the reconstruction and realignment of 12th Street. In this scenario, the Kaiser Convention Center parking lot would not be reconfigured and therefore the trees located in this area would be preserved. Approximately 59 trees would be preserved, including 12 protected trees (all flowering cherries), in and around the parking area. Trees along the median of the existing 12th Street alignment would still be removed ~~require removal~~ in order to accommodate the new roadway and modified grade of the park land.

Page 357 of the Draft EIR is revised as follows:

1. Project Objectives

This alternative would meet most project objectives, but to a lesser degree than the proposed project. All objectives for the Lake Merritt and Lake Merritt Channel, the Recreational Facilities, and the City-Wide Creeks Groups would be met. It is being considered, in part, because the U.S. Coast Guard and the marine shipping community have concerns about the potential safety and feasibility of the proposed under-bridge segments of the Waterfront Trail and because the U.S. Coast Guard has permitting authority in this area. The alternative would complete the missing segments of the San Francisco Bay Trail along the Oakland Estuary, albeit with segments that would not be constructed on the waterfront but rather on nearby streets. Because the trail would avoid contaminated properties, hazardous waste impacts associated with these properties would not occur but the properties would also not be remediated, one of the objectives of this project group. The alternative would support some of the objectives of OSCAR and the Estuary Policy Plan by completing a linear trail along the waterfront; however because the segments would be completed away from the shoreline in some cases, the alternative would not create as much physical and visual access to the Oakland shoreline as the proposed project.

Page 363 of the Draft EIR is revised as follows:

1. Methodology

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present and reasonably foreseeable future projects ~~or reasonably anticipated relevant projects~~ (including projects outside the control of the lead agency) or a summary of the projections in an adopted General Plan or related planning document. This cumulative impacts analysis considered development projections that are contained in ~~is likely to occur under the build-out of~~ the various elements of the City of Oakland General Plan, including the Land Use and Transportation Element (LUTE), and the Open Space, Conservation, and Recreation Element (OSCAR), and their related environmental review documentation. The projections account for past and present projects as well as reasonably foreseeable future development. In addition, the cumulative analysis considered specific projects, including the Oakland Whole Foods Market, the Jack London Square Redevelopment, and the Oak to Ninth Avenue Projects. As a result, the analysis is based on a projections approach, which has been refined by including additional information regarding specific existing and anticipated future projects.

Pages 363 to 364 of the Draft EIR are revised as follows:

a. Land Use. The majority of the Measure DD components would renovate or improve existing structures, recreational facilities, roadways, and creeks within the City of Oakland and would not change land use. New land uses would include roadway and park changes associated with Lake Merritt~~,~~ and the creation of new parks and installation of the new trail connections associated with the Waterfront Trail~~, and the construction of the East Oakland Sports Complex.~~ With one exception, t~~T~~he proposed land uses associated with the project would be compatible with the ~~surrounding~~ land use and zoning of the project site and surrounding neighborhood, which is the geographic area of potential cumulative effect for land use impacts. ~~One~~ The potential land use conflict, a potential safety hazard that would be created by constructing the trail across an operating industrial facility, was identified for the Waterfront Trail group.~~, which~~ This impact would be reduced to a less-than-significant level with implementation of the identified mitigation measure. The EIR analysis shows that the impact would not be cumulatively considerable for two reasons: 1) there are no other similar safety impacts to which the impact would contribute and 2) the residual effect would be eliminated by the proposed mitigation measure. Thus, the project ~~This site-specific impact~~ would not have a cumulative effect when considered with other projects and implementation of Measure DD would not result in any cumulatively significant land use impacts.

b. Transportation, Circulation and Parking. A detailed analysis was conducted for the purposes of assessing cumulative environmental impacts to the transportation system as described in Section IV.C. As described therein (see pages 133 to 134), the cumulative analysis analyzed the project in combination with past, present and reasonably foreseeable future projects. The cumulative analysis identified five significant cumulative impacts related to transportation (TRAF-5 through TRAF-9), three of which are identified as significant and unavoidable because they may not be reduced to less-than-significant levels. The impacts and mitigation are discussed in detail in Section IV.C. No significant impacts were identified for alternative modes of transportation. The project would not fundamentally conflict with adopted policies, plans, or programs supporting pedestrian and bicycle transportation or

transit use. The project would improve both pedestrian mobility and bicycle transportation. Although travel times would increase as a result of the project and affect some transit routes, travel times for other motor vehicles would increase by a similar amount, and travelers would not be discouraged from using transit as a result of the project. Thus, the project would not fundamentally conflict with adopted policies, plans, or programs supporting transit use and would not have a significant cumulative impact.

c. Air Quality. As noted in the air quality impact analysis in Section IV.D, the air basin within which the City of Oakland and the project components lie is non-attainment for ozone, PM_{10} and $PM_{2.5}$. As such, the project and other past, present and reasonably foreseeable future projects could result in an impact that is cumulatively significant for air quality related to these pollutants. However, the City finds that the project's contribution to the impact would not be cumulatively considerable and thus the impact is less than significant. According to the *Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines*, any proposed project that would individually have a less-than-significant air quality impact and is consistent with the General Plan, where the General Plan is consistent with the Clean Air Plan, would be considered to have a less-than-significant cumulative air quality impact. The Measure DD components would not have significant operational air quality impacts, therefore a determination of the cumulative impacts would be based on an evaluation of the consistency of the project with the City of Oakland's General Plan and of the General Plan with the regional air quality plan. As discussed in Section IV.D, tThe City of Oakland's General Plan is consistent with the 2005 Ozone Attainment Plan, the fourth triennial update of the Clean Air Plan, and the project is consistent with the General Plan~~;~~. In addition, the project would not generate objectionable odors, expose sensitive receptors to substantial air pollutant concentrations, or emit toxics that would contribute to a cumulative impact. Likewise, the project would not contribute to an impact associated with CO concentrations because CO concentrations would not increase as a result of the project. T~~t~~herefore the project would not have a significant cumulative impact.

d. Noise. As noted in the noise analysis in Section IV.E, t~~T~~he project components are primarily recreational facilities and water quality improvements that would not produce substantial noise during their operation and would not contribute substantially to the cumulative noise environment, which would generally include the project site and surrounding properties. Further, the noise impact analysis in Section IV.E notes that the primary source of noise in the project area is and would be motor vehicle noise. The analysis of c~~C~~umulative traffic noise impacts for all project components, as shown in Tables IV.E-12 and IV.E-13 and in the discussion under Section IV.E.2.b, was based on the cumulative traffic volumes (i.e., cumulative plus project scenario) generated for the traffic analysis in Section IV.C, which included the project and other past, present, and reasonably foreseeable future ~~planned~~ projects within the City of Oakland. The analysis demonstrates that the cumulative noise impacts from traffic would be less than significant for noise sensitive receptors within the City of Oakland.

There would be temporary construction noise impacts and one of these (i.e., pile driving) ~~that~~ would be significant if noise-reducing measures specified in the City's ~~Standard and~~ Uniformly Applied Development Standard Conditions of Approval are not feasible (as noted in Section IV.E). ~~However~~If they occur, these impacts would be limited to sites around Lake

Merritt, namely the E. 18th Street Pier, the 12th Street reconstruction area and Lake Merritt Channel, and a few segments of the Waterfront Trail ~~site-specific~~ and limited to the duration of construction period. Except as noted with respect to pile driving, there is no evidence that noise levels would be cumulatively significant. The noise levels in the project area are within the City's standards for noise and because construction projects in the cumulative scenario within the City of Oakland are required to comply with the City's Noise Ordinance and Conditions of Approval. ~~Thus,~~ The requirements will render cumulative construction noise and operational noise impacts ~~would be~~ less than significant.

e. Biological Resources. Project activities are not anticipated to make a cumulatively considerable contribution to ~~have~~ a cumulative significant impact on biological resources. The project would generally be conducted in an urbanized area and would increase open space and improve water quality, which would benefit wildlife. Other benefits include establishing foraging and refuge areas by restoring native vegetation, restoring wetlands, and removing exotic invasive vegetation, providing greater diversity of habitat, and improving connectivity between Lake Merritt and similar habitat areas within the area. Potential temporary impacts to wildlife, such as nesting raptors and songbirds~~,~~ during construction, injury to fish during pile driving, or disturbance of wildlife in the Channel by small boats, and impacts to waters of the U.S. and State ~~of some project components were identified, but these would be mitigated~~ would be avoided (impacts to wildlife and fish) or fully compensated for (impacts to waters of the U.S. and State) by the City's Conditions of Approval or by the mitigation measures recommended in this EIR. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same protective measures for biological resources and would not result in cumulative adverse impacts to wildlife. With implementation of the mitigation measures~~Because the potential impacts to biological resources would be beneficial, avoided, or fully compensated for, the project's incremental contribution would not be cumulatively considerable and the impact would be less than significant.~~fully mitigated and no cumulative effects to biological resources would result from this project~~.

Pages 365 to 366 of the Draft EIR are revised as follows:

g. Hydrology and Water Quality. The majority of Measure DD components would be constructed in an urbanized area of Oakland and would not significantly increase impervious surface coverage or result in flood hazards within the component sites. In fact, several Measure DD Project components would include measures to improve water quality.

Construction and operational-period impacts to stormwater that would result from implementation of the Measure DD Project would be minimized through compliance with the Water Board's regulations and implementation of the City's Standard Conditions of Approval. Nevertheless, as noted on page 260 of the Draft EIR, Lake Merritt is an impaired water body due to organic enrichment, low dissolved oxygen, and trash and the Estuary and San Francisco Bay, to which Oakland's creeks flow, are impaired for pesticides, dioxins, furans, PCBs, selenium, mercury, and exotic species. However, the EIR analysis shows that the project's contribution to the impact would not be cumulatively considerable for two reasons: 1) the project would not generate the chemical contaminants for which the water bodies are impaired and 2) the project would likely reduce organic nutrients due to the net

decrease in impervious surface around Lake Merritt and the Best Management Practices (BMPs) that are included in the project (e.g., grassy swales, porous pavements, and stormwater planters). Thus, the cumulative impact of the project is less than significant. ~~It is anticipated that other cumulative projects within the City of Oakland would be required to undergo the same water quality maintenance measures and would not result in cumulative adverse impacts to water quality. Therefore, implementation of the proposed project would not result in significant cumulative hydrology and water quality impacts.~~

h. Geology, Soils and Seismicity. The area of cumulative effects for geology, soils and seismicity issues, such as liquefaction, landslides, lateral spreading, expansive soils, landfills, and septic systems, is the project site. ~~The geologic, seismicity, and soils conditions of this site are specific to the individual component sites. Other sites in the vicinity may have similar issues and concerns regarding geological conditions and hazards.~~ For geologic, seismicity, and soils issues, the proposed development does not influence or degrade conditions in the area of cumulative effects, because among other reasons, ~~as long as~~ the impacts of the individual components are reduced to a less than significant level by the California Building Standards Code and the City's Uniformly Applied Development Standard Conditions of Approval with which the project will be required to comply. In addition, many features of the project, such as improvements to trails, creeks, landscaping, and water quality, do not create any hazards. Others, such as renovations of the Studio One Art Center, the Municipal Boathouse and the Pergola, would reduce existing hazards by strengthening existing structures. These actions would not contribute to a cumulative impact and, in the case of renovations would have net beneficial effects. New structures associated with past, present and reasonably foreseeable future projects as well as the current project, such as the East Oakland Sports Complex, would be built to current seismic codes ensuring that potential seismic hazards are less than significant. Thus, the project would not make a cumulatively considerable contribution to a cumulative significant impact related to geology, soils or seismicity.

i. Hazards and Hazardous Materials. The hazards and hazardous materials issues for the proposed project are specific to the individual component sites and would not lead to any cumulative impacts related to hazards. Most components of Measure DD would not store or use substantial quantities of hazardous materials and would, at some sites, help ensure that potential chemical hazards in soil or groundwater are remediated and the risk from these hazards is reduced. ~~Some hazardous materials would be stored for maintenance and disinfection purposes at the proposed East Oakland Sport Complex. As all such storage and use in the City of Oakland must comply with State and local regulations for hazardous materials, this would not have a significant cumulative impact.~~

Hazardous materials transport, storage and use would be cumulatively significant if the project and cumulative projects created a significant hazard to the public or the environment within the area of cumulative effect (i.e., the project construction sites, the East Oakland Sports Complex site, or roadways to these sites). The cumulative effect would create a significant hazard to the public if the hazardous materials in the cumulative scenario exceeded regulated quantities or resulted in the improper use or storage of hazardous materials. The City finds that storage of common hazardous materials in accordance with

State and federal regulations and the City's Best Management Practices by the project in combination with past, present, and reasonably foreseeable future projects would not create a significant cumulative hazard to the public or the environment. Thus, the impact would be less than significant.

For emergency evacuation routes, the area of impact would be the areas served by 12th Street, the evacuation route that would be temporarily closed during construction. During the period of project construction, other projects in the cumulative scenario could have street closures that would affect the same areas, which could constitute a cumulative impact. However, the proposed mitigation requires the review and approval of the temporary detour plans by the City's Office of Emergency Services, which would be aware of other closures in the City, and would ensure that the project's contribution is less than cumulatively considerable because it requires that alternative routes are identified and available during project construction. Because the project's contribution to the cumulative impact is not cumulatively considerable the impact is less than significant.

j. Public Services and Recreation. ~~Development of t~~The proposed Measure DD Implementation Project~~, in conjunction with planned future development as anticipated by the City's General Plan~~, would incrementally increase demand for police and fire services as noted in Section IV.K, which finds that the project sites are currently adequately served and the impacts on demand would be less than significant. For recreation, the analysis finds that service is currently inadequate, as the City does not meet its goals of 10 acres of total and 4 acres of urban parkland per 1,000 residents. However, the project would improve recreational facilities and increase the current ratios by constructing new facilities in East Oakland and by increasing the acres of parkland around the south end of Lake Merritt. Thus the project would have a beneficial effect on recreation. Therefore, the cumulative analysis focuses on police and fire services. ~~public facilities and services. However, none of the public facilities or services analyzed would experience significant impacts or create demand beyond that anticipated in the General Plan.~~

There is no evidence that the demand for police and fire services would be cumulatively significant because adequate fire and police service is provided to the project area and development under cumulative conditions would be addressed by the service providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. Build-out of the cumulative projects would not result in cumulative impacts related to physical capacities, service levels or funding availability, particularly because the increased demand for services has, in many cases, been anticipated in planning and policy documents and would be shared across service areas within the City. In addition, given the acceptable levels of service as described in Section IV.K, the demand by the project when combined with past, present, and reasonably foreseeable future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. As a result, no significant cumulative impacts would result.

k. Utilities and Infrastructure. The proposed Measure DD Implementation Project is located in areas already served by utilities and the incremental increase in demand for services would not require the expansion or construction of new facilities. The cumulative increase in demand on the utility providers and infrastructure in the City resulting from implementation of Measure DD, in combination with past, present and other reasonably foreseeable projects in Oakland, is anticipated within the General Plan as well as within plans prepared by each of the utility providers to address projected growth.

There is no evidence that the demand for utilities and infrastructure would be cumulatively significant because adequate service is provided to the project area and development under cumulative conditions would be addressed by the utility providers prior to completion of development to ensure that service demand can be reasonably be accommodated at that time. In addition, given the acceptable levels of service as described in Section IV.L, the demand by the project when combined with past, present and reasonably foreseeable future projects would not be cumulatively considerable because the facilities that are part of the project, such as new trails, new landscaping, creek restoration activities, renovations of buildings and other historic structures, creation of bike lanes, and water quality improvements do not create demand for services, have a demand for services that is the same as the existing project sites, or have very low demand for services. Therefore, no significant cumulative impacts would result.

B. REVISIONS TO THE DRAFT EIR INITIATED BY THE CITY

Clarification regarding Compliance of the Project with the City's Uniformly Applied Development Standard Conditions of Approval

Page 64 is revised as follows:

The City's Uniformly Applied Development Standard Conditions of Approval are incorporated into projects as Conditions of Approval regardless of a project's environmental determination. As applicable, the Conditions of Approval are adopted as requirements of an individual project when it is approved by the City and are designed to, and will, substantially mitigate environmental effects. For the Measure DD Project the City's Conditions of Approval have been incorporated as part of the project. As such, the project will comply with all applicable Uniformly Applied Development Standard Conditions of Approval.

In reviewing project applications, the City determines which of the standard conditions are applied, based upon the zoning district, community plan, and the type(s) of permit(s)/approval(s) required for the project. Depending on the specific characteristics of the project type and/or project site, the City will determine which Development Standards apply to each project; for example, Development Standards related to creek protection permits will only be applied projects on creekside properties.

The Development Standards incorporate development policies and standards from various adopted plans, policies, and ordinances (such as the Oakland Planning and Municipal Codes, Oakland Creek Protection, Stormwater Water Management and Discharge Control

Ordinance, Oakland Tree Protection Ordinance, Oakland Grading Regulations, National Pollutant Discharge Elimination System (NPDES) permit requirements, Housing Element-related mitigation measures, California Building Code, and Uniform Fire Code, among others), which have been found to substantially mitigate environmental effects. Where there are peculiar circumstances associated with a project or project site that will result in significant environmental impacts despite implementation of the Development Standards, the City will determine whether there are feasible mitigation measures to reduce the impact to less than significant levels. The project will comply with all applicable Uniformly Applied Development Standard Conditions of Approval and mitigation measures discussed in the EIR.

Clarification regarding Criterion of Significance for Cumulative Traffic Impacts

Questions have been raised regarding the use on pages 122-123 in the Draft EIR of the significance criterion 1)h., which states, "A project's contribution to cumulative impacts is considered "considerable" when the project contributes five (5) percent or more of the cumulative traffic increase as measured by the difference between existing and future cumulative (with project) conditions."

For example, page 134 of the Draft EIR states that "If the Measure DD Implementation Project contributes less than 5 percent of the cumulative traffic increase at an intersection as measured by the difference between existing and future cumulative (with project conditions) the impact is considered less than significant." The Draft EIR text then continues by identifying four intersections where the impacts "were found to be less than significant for this reason." For purposes of clarification, however, the Draft EIR's use of the referenced 5% contribution criterion merely provides information and context for this project and is not the sole basis for determining that cumulative impacts would (or would not) occur at these (or any other) locations. These intersections would not have significant cumulative effects under any other of the significance criteria identified in the Draft EIR. No impact or intersection was omitted from consideration, nor the potential significance of any impact understated by application of this criterion.

A summary of traffic operations is provided in Table IV-1 for the four intersections found to have less than significant impacts because the project would contribute less than 5 percent of the cumulative impact. Detailed capacity analysis worksheets are provided in Appendix A.

At the first three intersections listed in the table, the project in combination with past, other current and probable near term projects scheduled to be complete by Year 2025 would cause significant impacts. However, the project would not make a considerable contribution to those cumulative impacts because either the project would not contribute to the impact or a mitigation measure would reduce the project's contribution to less than significant.

At the MacArthur Boulevard/Lakeshore Avenue intersection, Mitigation Measure TRANS-3 would reduce project impacts to a less-than-significant level as described on page 127 of the Draft EIR. Similarly, this mitigation measure would reduce delays and improve the LOS to an extent that would eliminate the project's contribution to the cumulative impact.

Table IV-1: Intersection Levels of Service – Cumulative (2025) Conditions

Intersection	Traffic Control		Peak Hour	Existing		Cumulative No Project		Cumulative Plus Project		Cumulative Plus Project With Mitigation	
	(Existing)	(Future)		LOS[a]	Delay[b]	LOS[a]	Delay[b]	LOS[a]	Delay[b]	LOS[a]	Delay[b]
6. MacArthur Blvd/Lakeshore Ave	Signal	Signal	AM	D	36.0	D	49.2	E	68.7	D	35.3
			PM	F	89.3	F	168.4	F	225.7	F	166.9
29. Embarcadero /5th Ave	Minor Stop	Signal	AM	B	12.5	C	28.5	C	29.1	C	29.1
			PM	E	39.0	F	200.5	F	200.5	F	200.5
30. 27th St/Bay Pl/Harrison St	Signal	Signal	AM	F	146.3	F	88.2	E	67.1	E	67.1
			PM	C	31.8	F	93.8	E	70.7	E	70.7
31. Grand Ave/Harrison St [c]	Signal	Signal	AM	D	39.4	F	82.5	D	54.4	D	54.4
			PM	C	34.8	E	64.3	E	64.5	E	64.5

Notes:
Shaded values indicate a potential significant impact.
[a] LOS = Level of Service
[b] Average control delay in seconds per vehicle
[c] Defined as a downtown intersection
Source: Dowling and Associates, 2008.

At the Embarcadero/5th Avenue intersection, a cumulative impact would occur during the PM peak hour, but the project would not contribute to the impact. At the 27th Street/Bay Place/Harrison Street intersection and at the Grand Avenue/Harrison Street intersection, the project would reduce significant cumulative impacts to a less-than-significant level because the project would divert traffic from those intersections.

Page 134 is revised as follows:

> Some intersections degrade under cumulative conditions due primarily to other projects that would be constructed in the future. ~~If the Measure DD Implementation Project contributes less than 5 percent of the cumulative traffic increase at an intersection as measured by the difference between existing and future cumulative (with project conditions) the impact is considered less than significant.~~ The impacts at the following four intersections were found to be less than significant ~~for this reason~~:
>
> - MacArthur Boulevard/Lakeshore Avenue
> - Embarcadero/5th Avenue
> - 27th Street/Bay Place/Harrison Street
> - Grand Avenue/Harrison Street
>
> The Measure DD Implementation Project would add traffic to some of the movements at the MacArthur Boulevard/ Lakeshore Avenue intersection; however, implementation of Mitigation Measure TRANS-3 would result in LOS D (35.3 seconds delay) traffic operations during the AM peak hour and at LOS F (166.9 seconds delay) during the PM peak hour, which would be less delay than for cumulative conditions without the Project. Therefore, the Project would not cause any of the thresholds listed in section C.1.b.(1)1) to be exceeded at the MacArthur Boulevard/ Lakeshore Avenue intersection. The Project would not add traffic to the Embarcadero/5th Avenue intersection and would decrease traffic volumes at the 27th Street/Bay Place/Harrison Street and Grand Avenue/Harrison Street intersections.

Clarifications regarding Mitigation Measures for Biological Resources

Page 211 is revised as follows:

> **b. Impacts Applicable to All Project Groups.** Several of the impacts to biological resources that may result from the implementation of Measure DD would essentially be the same for each or most of the four project groups. These impacts are defined below for each criterion of significance listed above. Where applicable, the City's specific Standard Conditions of Approval that will reduce potential impacts to a less-than-significant level are identified in the text after the discussion of the impact. As with all impacts discussed in this EIR, when specific Standard Conditions of Approval do not reduce potential impacts to a less-than-significant level, the EIR identifies feasible mitigation measures, when available, to reduce the impact to less-than-significant. In some instances, the mitigation measures call for development of site-specific plans, for which the City lacks sufficient project detail to develop at this time. The plans identified in these mitigation measures will be implemented prior to any activities that could result in the identified potentially significant impacts.

Page 214 is revised as follows:

Mitigation Measure BIO-1b (Group 2): Prior to ground disturbance, a qualified biologist experienced with SMHM exclusion procedures shall prepare a site-specific SMHM avoidance plan. The plan shall be implemented during construction at each specific site. At a minimum, the plan shall include (1) the installation of silt fencing around the entire portion of the work area (that is within 100 feet from the edge of the marsh) to exclude SMHM from entering, (2) the clearing of all ground vegetation within the fenced area, and (3) the relocation to Damon Marsh of any SMHM found during the vegetation removal effort. Construction work shall start as soon as possible (and no longer than one week) after vegetation has been cleared. All exclusion measures and initial ground disturbance activities shall be monitored by a biologist, who has the necessary state and federal permits to handle and relocate SMHM. (LTS)

Page 216 is revised as follows:

Mitigation Measure BIO-3b (Groups 1, 2, and 4): Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). If feasible, replacement habitat shall be created/preserved in the same general area as the original impact. Off-site mitigation may be approved if the amount of required replacement habitat exceeds that which is available near a given impact site. A wetland mitigation and monitoring plan (MMP) shall be developed and implemented for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s). (LTS)

CITY OF OAKLAND MEASURE DD IMPLEMENTATION PROJECT ENVIRONMENTAL IMPACT REPORT

RESPONSE TO COMMENTS

STATE CLEARINGHOUSE #2006122048

LSA

January 2008

CITY OF OAKLAND MEASURE DD IMPLEMENTATION PROJECT ENVIRONMENTAL IMPACT REPORT

RESPONSE TO COMMENTS

STATE CLEARINGHOUSE #2006122048

Submitted to:

City of Oakland
Office of the City Administrator
250 Frank H. Ogawa Plaza, Suite 4344
Oakland, CA 94612

Prepared by:

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2215 Fifth Street
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LSA

January 2008

APPENDIX A

TRAFFIC DATA

APPENDIX A-1

ANALYSIS FOR 11TH-12TH/14TH STREET INTERSECTION

APPENDIX A-2

CUMULATIVE TRAFFIC ANALYSIS FOR TABLE IV-1

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Community and Economic Development Agency
Planning & Zoning Division

(510) 238-3941
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TDD (510) 839-6451

MEASURE DD IMPLEMENTATION PROJECT
NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL IMPACT REPORT (FINAL EIR)
AND NOTICE OF A PLANNING COMMISSION MEETING TO CERTIFY THE FINAL EIR

TO: All Interested Parties

SUBJECT: Notice of Availability of Final Environmental Impact Report for the Measure DD Implementation Project and Notice of a Planning Commission Meeting to certify the same

CASE NO.: ER 06-0017 (State Clearinghouse Number 2006122048)

PROJECT SPONSOR: City of Oakland

PROJECT LOCATION: The proposed components of the Measure DD Implementation Project would be located in the City of Oakland around Lake Merritt and the Lake Merritt Channel generally along Lakeshore Avenue, Lakeside Drive, and 12th Street; on the Oakland waterfront between Alice Street and 66th Avenue; at the Ira Jinkins Recreational Center on Edes Avenue in East Oakland; at the Studio One facility on 45th Street in North Oakland; and at multiple small creekside locations throughout the City.

PROJECT DESCRIPTION: In November 2002, Oakland voters passed a $198,250,000 bond measure entitled Oakland Trust for Clean Water, Safe Parks (Measure DD)., This bond measure authorizes funding for physical improvements to existing parks; acquisition of land for new parks; development of new parks and recreation facilities; clean water measures; restoration and rehabilitation of recreation buildings; and implementation of creek and waterway protection and restoration activities. The proposed project would implement the activities funded by Measure DD, which include the following:

- Lake Merritt and Lake Merritt Channel Improvements
  - 12th Street Improvements
    - Replace the 12th Street culvert at Lake Merritt Channel with a bridge to increase tidal flow into and out of Lake Merritt
    - Reconfigure 12th Street, create a new 4-acre park, and connect these features to the Lake Merritt Channel
  - Lake Merritt Channel
    - Construct a bridge to replace the existing culvert at 10th Street
    - Redesign Channel at the Lake Merritt flood control station at 7th Streets
    - Improve bike, pedestrian access, restore wetlands and make other Channel and shoreline improvements
  - Lakeshore Avenue, El Embarcadero, Pergola, and E. 18th Street Pier Improvements
    - Consolidate the El Embarcadero roadway to form a “Grand Lake green link”
    - Renovate Pergola
    - Renovate E.18th Street Pier
    - Widen Lake Merritt Park paths and add bike lanes by reconfiguring Lakeshore Avenue
  - Lakeside Drive and Municipal Boathouse
    - Widen Lake Merritt Park paths and add bike lanes by reconfiguring perimeter streets (Oak Street, Harrison Street, and Lakeside Drive)
    - Renovate the Municipal Boathouse at 1520 Lakeside Drive and restore public use
  - Snow Park and Lakeside-Harrison-20th Street Intersection
    - Expand Snow Park and redesign the Lakeside Drive-Harrison Street-20th Street Intersection
    - Implement system-wide improvements including paths, irrigation, landscaping, furnishing, restrooms and signs
  - Bellevue Avenue Redesign, Children’s Fairyland and the Sailboat House
    - Redesign Bellevue Avenue to improve circulation and to accommodate parking moved from the Sailboat House
    - Renovate Children’s Fairyland
    - Renovate the Sailboat House and convert some of the adjacent parking lot to parkland

- Water Quality Control Measures and Other Improvements
  - Install stormwater filters, floating trash barriers, and aerating fountains, and implement other water quality improvements, including goose management elements
  - Repair or replace Lake Merritt retaining walls

- Oakland Waterfront Trail and Access Improvements
  - Acquire land for conservation and remediation purposes
  - Remediate hazardous materials from contaminated soils
  - Provide continuous public access from Jack London Square to Martin Luther King Jr. Regional Shoreline
  - Construct an access/overlook area at 66th Avenue
  - Acquire and develop Estuary Park, Meadow Park and a new park in the area of the 9th Avenue Terminal
  - Complete Union Point Park
  - East and North Oakland Recreation Facilities
  - Construct the East Oakland Sports Complex
  - Renovate and restore Studio One Art Center

- City-wide Creeks Restoration, Preservation and Acquisition
  - Restore and rehabilitate creeks by creating natural meanders, regrading and stabilizing banks, removing failing structures, and landscaping with native plants
  - Acquire creekside properties to facilitate restoration and habitat preservation

Implementation of the Project is anticipated to require actions or approvals by the City including design review, conditional use permits, tree removal permits, grading permits, and creek protection permits. These actions will be considered after certification of the Final EIR.

ENVIRONMENTAL REVIEW: On July 20, 2007, a Draft EIR was published for this project, and a 52-day public review and comment period occurred from July 20, 2007 to September 10, 2007. The standard 45-day minimum comment period specified by State law was extended to allow for additional public review opportunities after the Labor Day holiday in early September. In addition, because September 10 was a City of Oakland holiday and City offices were closed, public comments were accepted until September 11, 2007. All comments that were received have been compiled and responded to in a Response to Comments document, along with changes and clarifications to the Draft EIR. The Response to Comments document, together with the Draft EIR, constitutes the Final EIR for the proposed project. The City of Oakland, as the Lead Agency, is hereby releasing this Final EIR, finding it to be accurate and complete and ready for certification. The preparation of the Final EIR has been overseen by the City's Environmental Review Officer or his/her representative, and the conclusions and recommendations in the EIR document represent the independent conclusions and recommendations of the City. Copies of the Final EIR will be available for distribution to interested parties at no charge starting Friday, January 25, 2008, after 3:00 p.m. at the Community and Economic Development Agency, Planning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612, Weekdays, 8:30 a.m. to 5:00 p.m. and on the City of Oakland Website at:
http://www.oaklandnet.com/government/ceda/revised/planningzoning/MajorProjectsSection/environmentaldocuments.html

Public Hearing: The Oakland Planning Commission will hold a public hearing on February 13, 2008, to consider certification of the Final EIR for the project. Project approvals will be acted upon by the appropriate agencies at later dates. For further information please contact Elois A. Thornton, Planner IV, City of Oakland, Community and Economic Development Agency, Planning Division, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, California 94612; telephone (510) 238-6284; email: eathornton@oaklandnet.com.

PUBLIC HEARING:

Wednesday, February 13th, 2008 at 6:00 p.m. City Planning Commission, Hearing Room 1, City Hall, One Frank H. Ogawa Plaza (Considering certification of the Final EIR)

Dated: January 25, 2008

Elois A. Thornton
Planner IV